

MANUFACTURERS RECORD

A Weekly Newspaper Devoted to the Industrial, Financial, Railroad,
Mining, Contracting, Engineering, Building, and General
Business Interests of the South and Southwest

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No. 7

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Single Copy 15 Cents

Part I of this number of the Manufacturers
Record is the regular weekly issue.

Part II covers the Thirtieth Anniversary
features and contains all of the statistical
survey and special articles by authorities
dealing with Thirty Years of Southern
Upbuilding and with the material
resources of the South.

Alphabetical Index, Page 114.
Classified Index, Pages 108 to 113.
Classified Opportunities, Pages 78, 79 and 80.

BALTIMORE, FEBRUARY 22, 1912

CLINCHFIELD COAL

CLEAN



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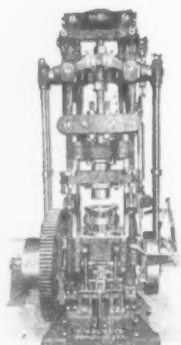
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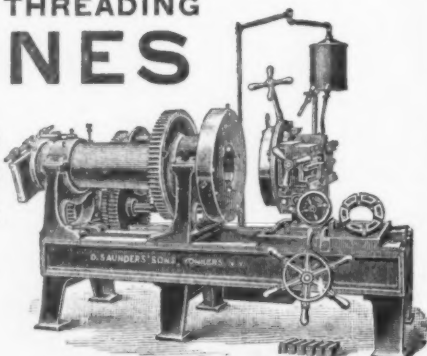
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No. 6 has a range of 2 1/2 to 8".

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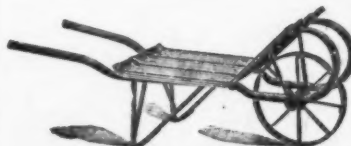
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A11

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We believe we have reached the acme of efficiency and economical service in the Columbia Mazda lamp; we know these lamps may serve you well.

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Established 1889

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WHY YOU SHOULD USE
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Our catalog will explain.

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Are Not Expensive**

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We have been making fire alarms for forty years, and have larger space devoted to such work than any other plant in the world; and as our selling expenses are much less than other manufacturers, our systems not only cost less than others, but are very reasonable in price.

We want to have a talk with Southern town officials, and invite correspondence.



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Would You Prevent Fire Loss?**

Our Fire Alarm System Does Both

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Let us look into your situation and make suggestions and quotations.

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Relay Station P. O.

BALTIMORE, MD.

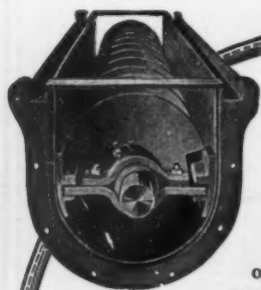
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Catalog
34

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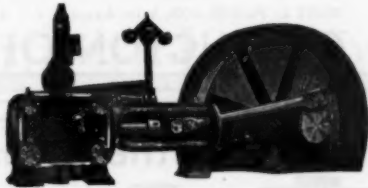
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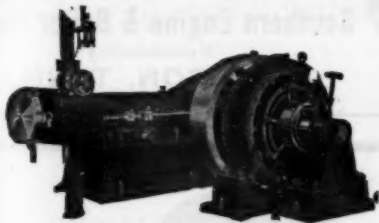
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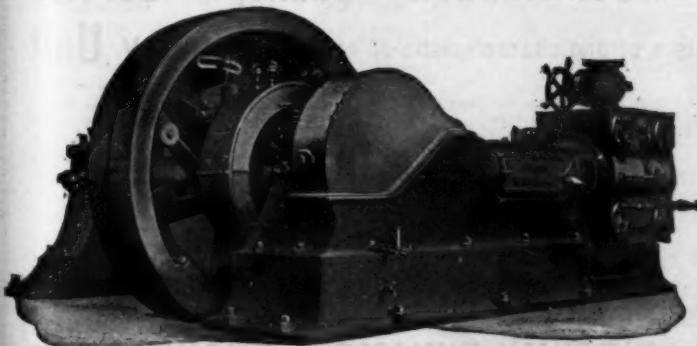
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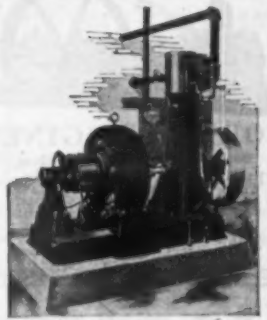
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Will generate current for individual motors operat-
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By combining a multi-stage turbine having a limited number of stages with
the De Laval Reduction Gear, the most convenient, most efficient and most
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worked out to secure the most perfect turbine ever built.

The **Diaphragms** carrying the guide vanes placed between stages are made
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retain the moving parts in case of accidental overspeeding.

Two **Governors** are supplied, a heavy, substantial, speed-controlling governor
operating a double-seated balanced valve, and a sensitive emergency governor
which comes into action only upon overspeeding and which trips a combined trip
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an ordinary throttle valve, thereby insuring that it will also be in working
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We shall be pleased to furnish full particulars concerning this notable devel-
opment and improvement in turbine machinery to engineers, owners and others
interested in power development. Ask for Bulletin No. 46.

DE LAVAL

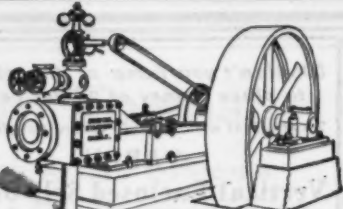
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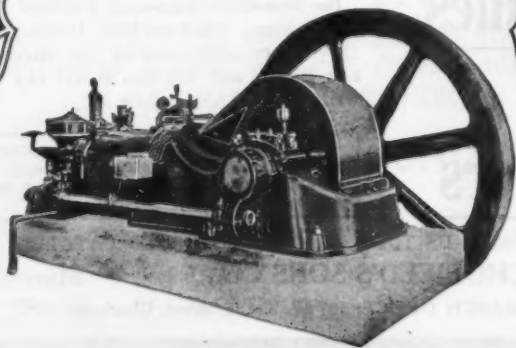
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 Steady as a clock.
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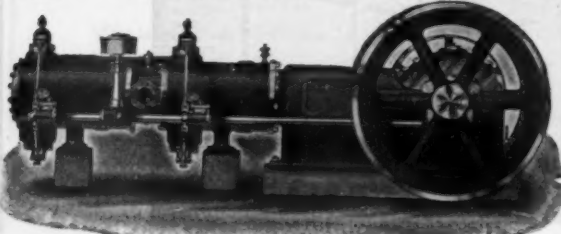
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 Especially Adapted to Mill Elevators and Cotton Gins



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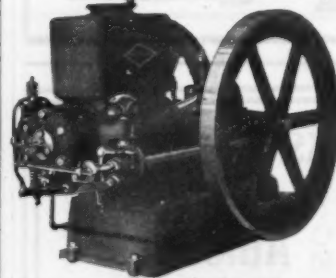


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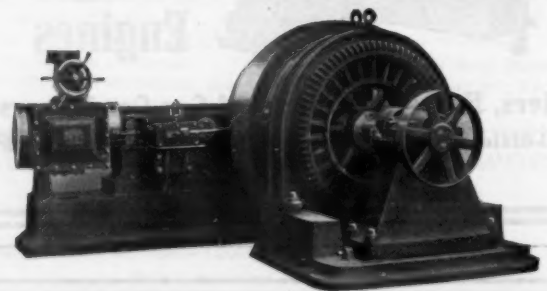


We make an improved heavy duty gasoline engine of all sizes for all purposes.

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The **Combination of Quality and Service**
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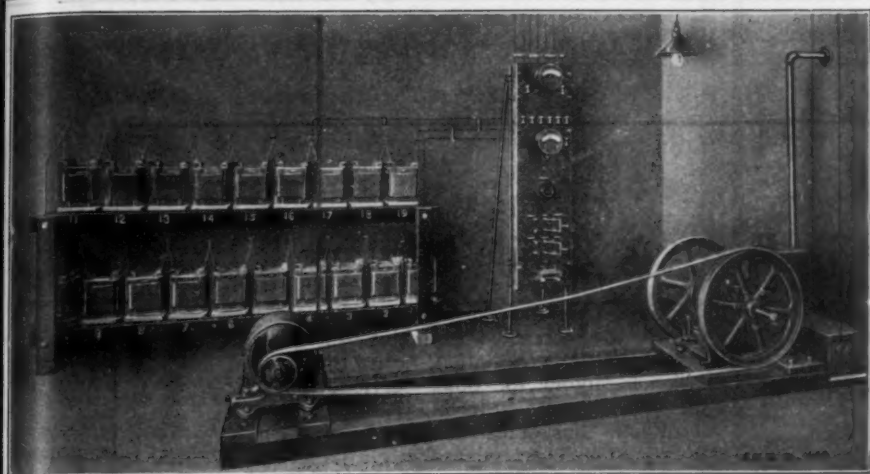
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It represents a unit that is compact, yet with every working part accessible. There is not a surface subject to wear that does not have quick and ready means of adjustment. Ridgway Engines are quiet in operation. They are clean, and highly economical in the consumption of steam and oil.

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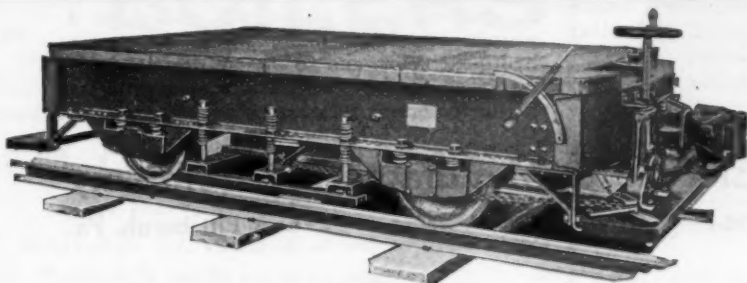
The "Chloride Accumulator"

used with the electric lighting plants of this company is the same battery used by the large Central Stations, Electric Railways, Telephone and Telegraph Companies, etc. You will find complete information in "Hand Book HL". Write the nearest office for a copy.

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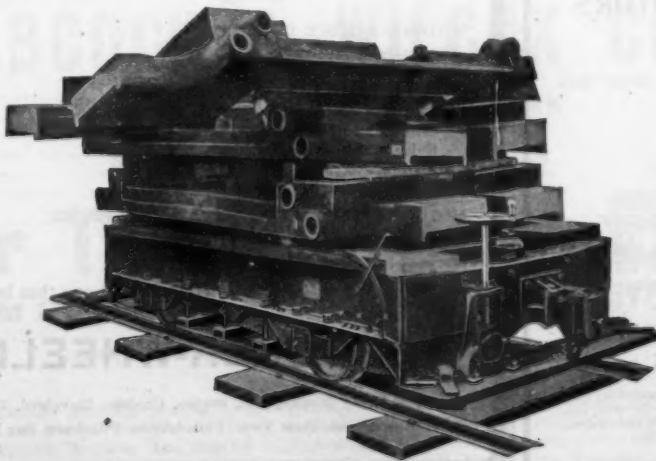
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is to equip it with a motor especially made for it. There is only one line of motors designed and constructed for the sole purpose of driving textile machines, namely, Westinghouse Textile Motors.

These motors, while of the same general appearance, are made with modified characteristics suitable to the different machines they are intended to operate. They cover the requirements of pickers, lappers, cards, slubbers, spinning frames, warpers, looms, hydro-extractors, dyehouse machinery, and other machines used in the textile industry.

Westinghouse Textile Motors were developed with an intimate knowledge of the

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Westinghouse Electric & Manufacturing Company

Sales Offices in 45 American Cities

East Pittsburgh, Pa.

MOLONEY TRANSFORMERS

MOLONEY ELECTRIC CO., ST. LOUIS, U. S. A.

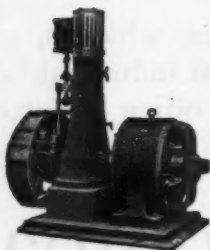
WINDSOR ONT., CANADA.

50 TO 500 LIGHTS

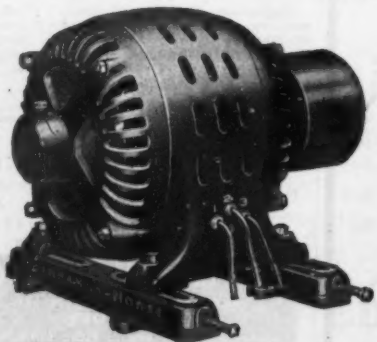
This outfit will provide 50 to 500 lights in your factory, house, farm or barns, and power for driving any motors required. Possibly the cheapest and most reliable unit on the market.

Write us for prices.

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FAIRBANKS-MORSE INDUCTION MOTORS



HAVE

High efficiency at both full and half loads.
High power factor.
Small idle currents.
High starting torque.
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They will give you ideal service, freedom from dirt and grease and will reduce your power cost.

Sizes, 1 to 200 H. P.

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Chicago, Ill.

INFORMATION

as to the application of electric drive to all sorts of machinery is contained in our Bulletins as follows:

GENERATORS, ALTERNATING CURRENT.

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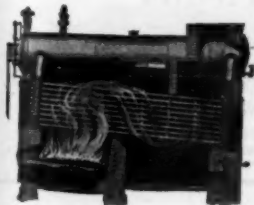
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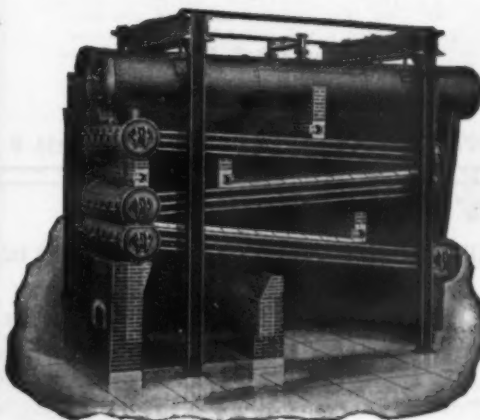
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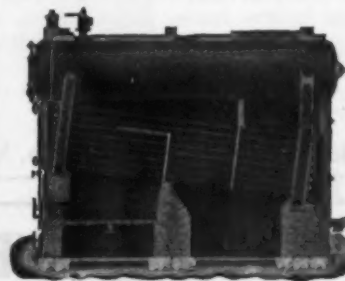
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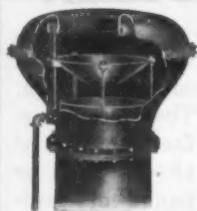


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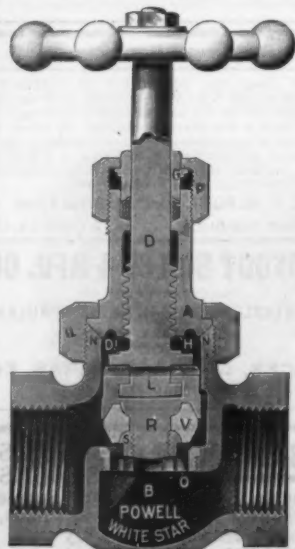
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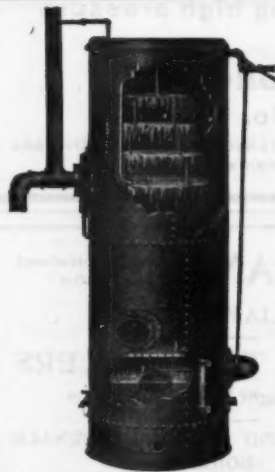
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VITRIBESTOS LINING



Fig. 91

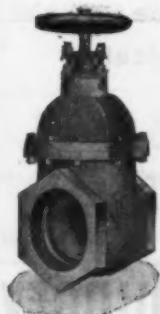


Fig. 57

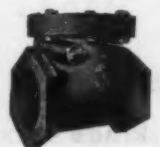


Fig. 105

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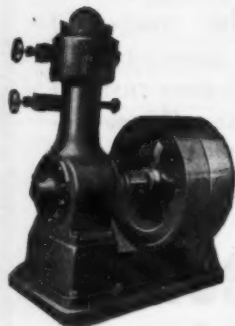
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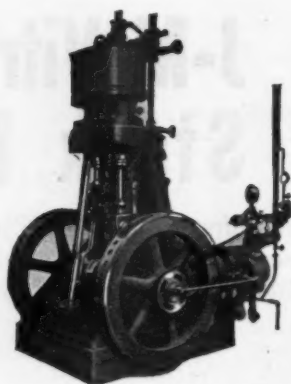
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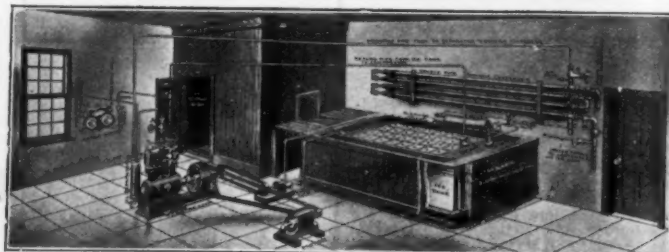
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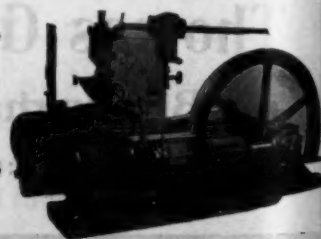
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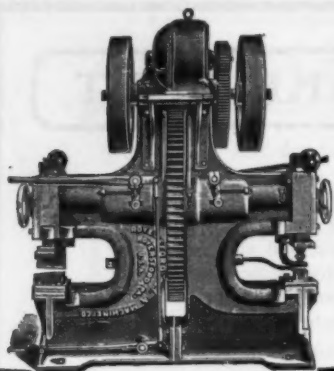
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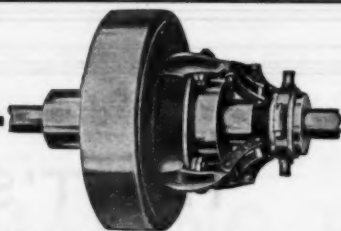
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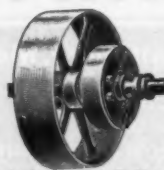
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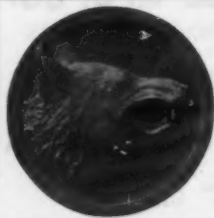


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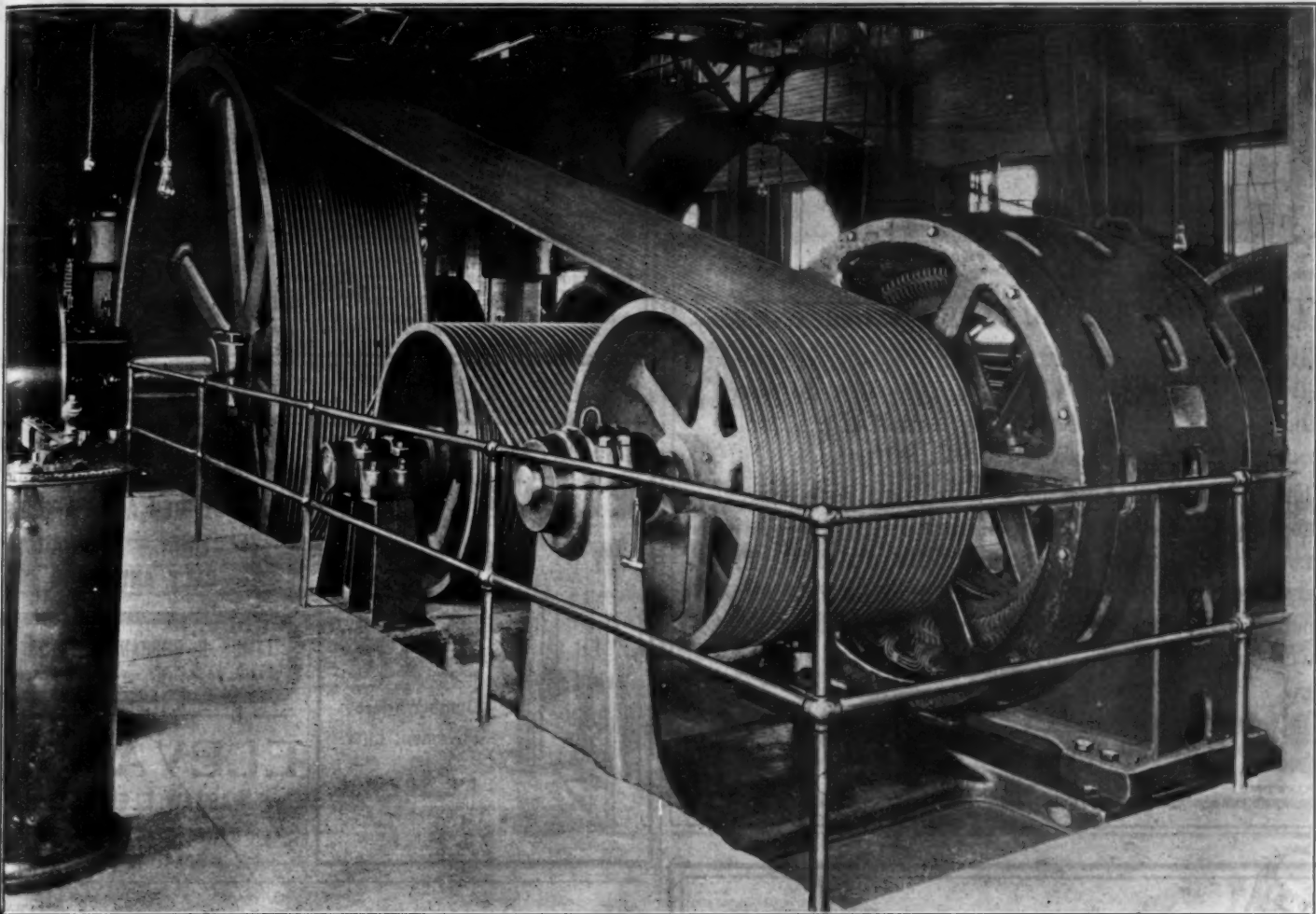
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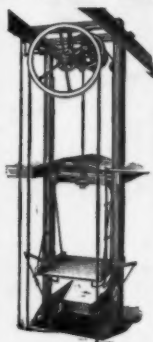
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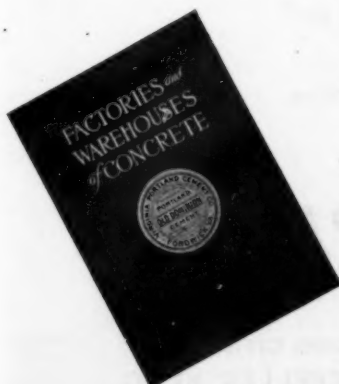
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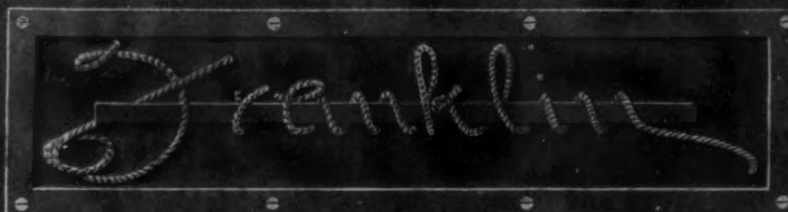
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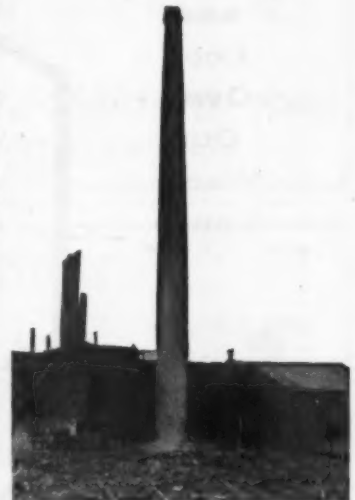
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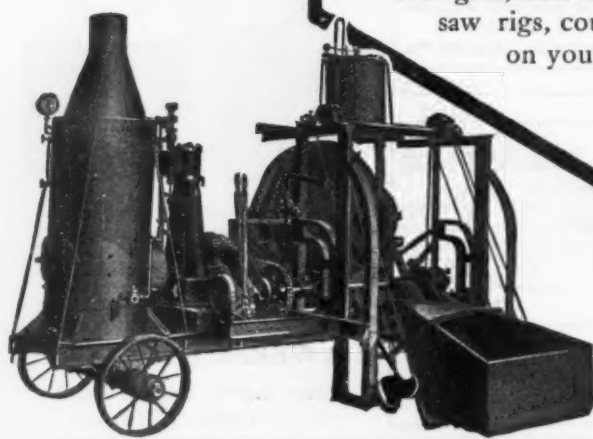
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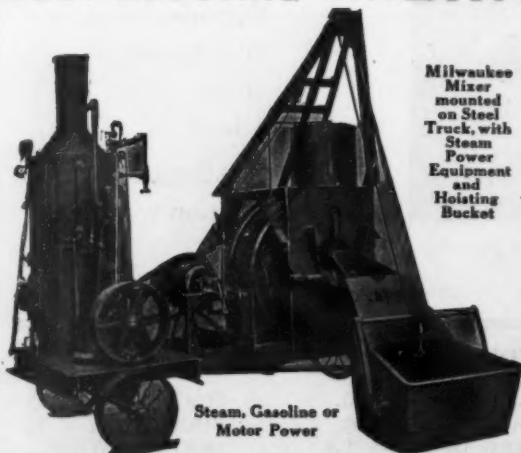
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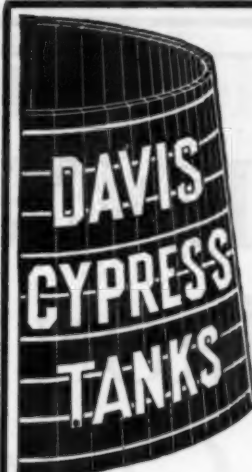
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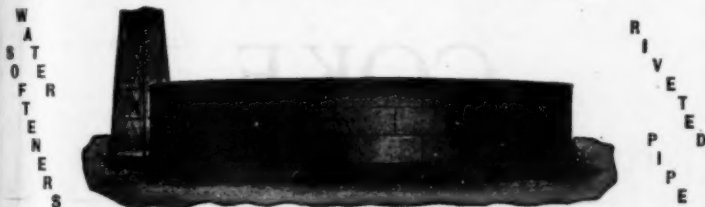
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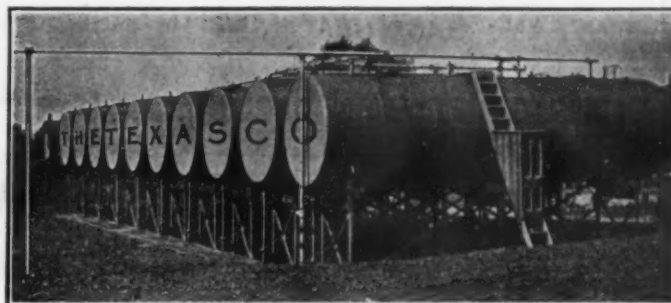
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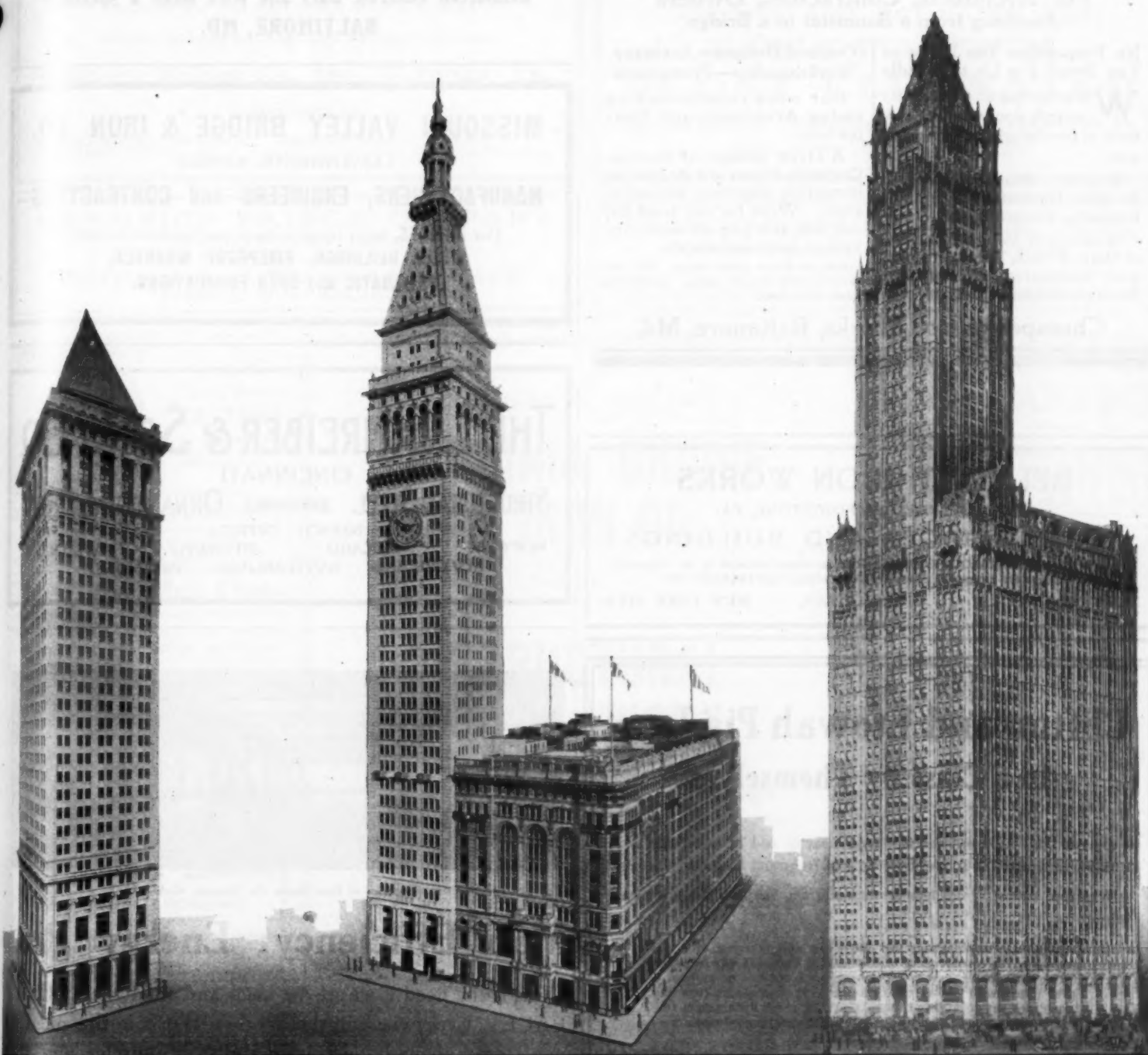
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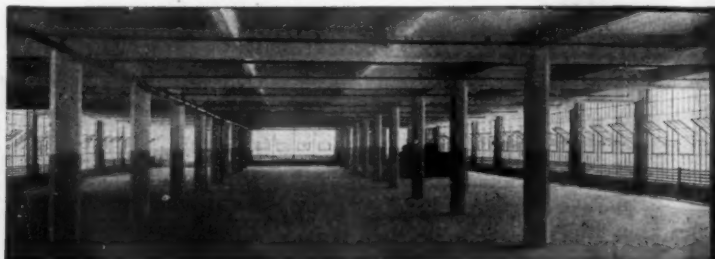
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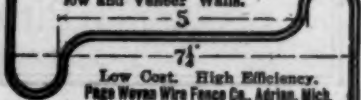
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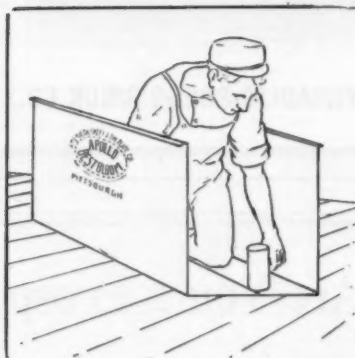
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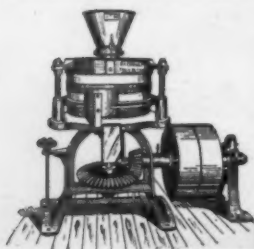
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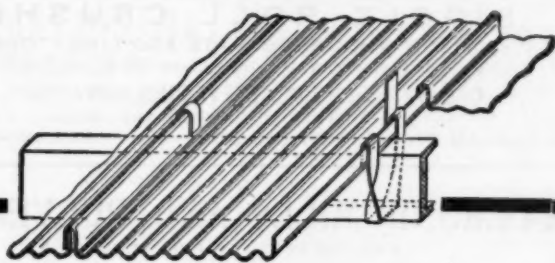
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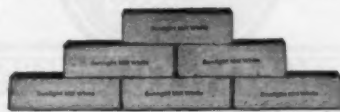
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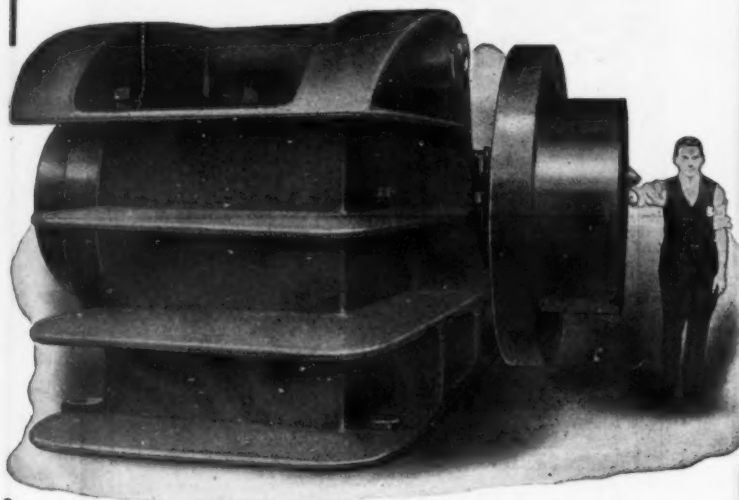
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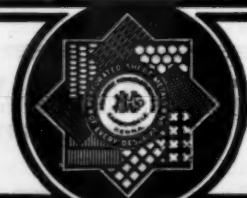
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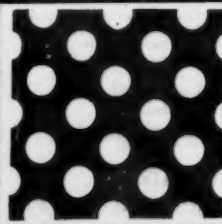
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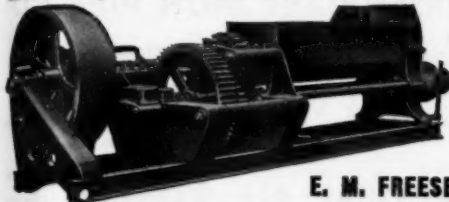
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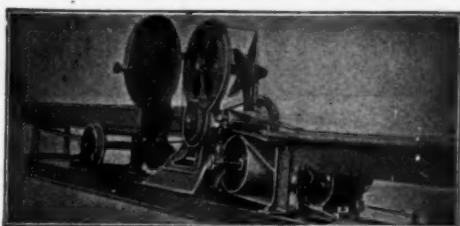
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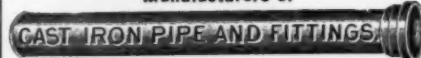
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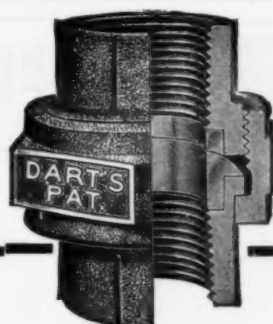
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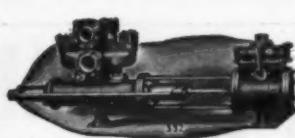
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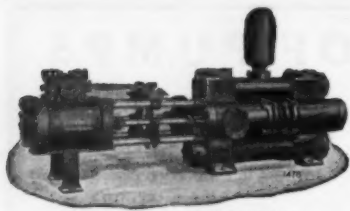
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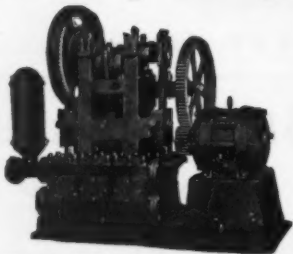


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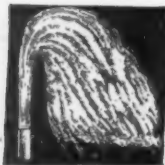
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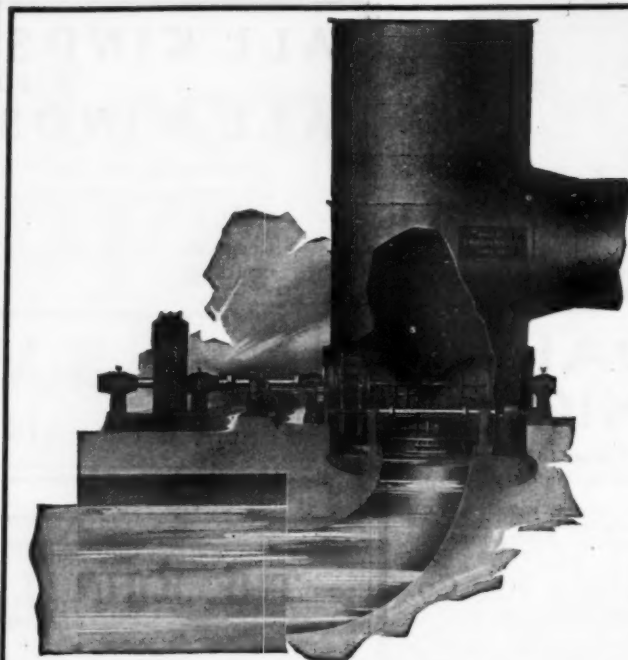
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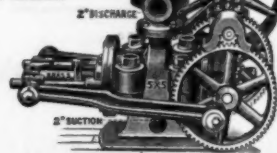
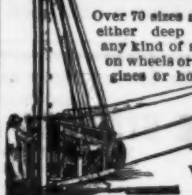


Fig. 1889

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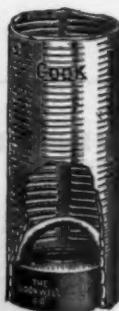
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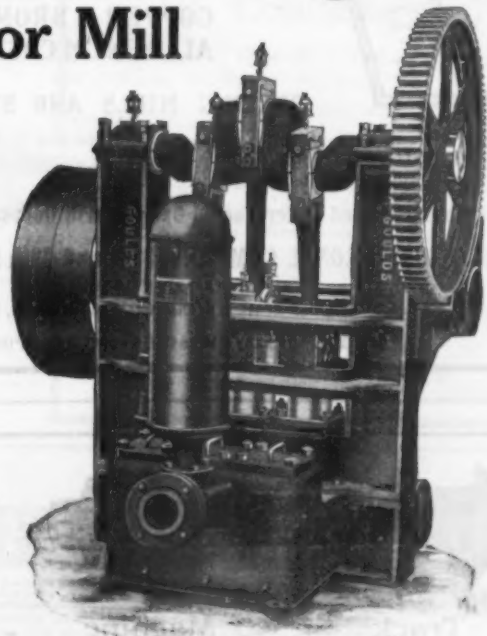



Fig. 1009

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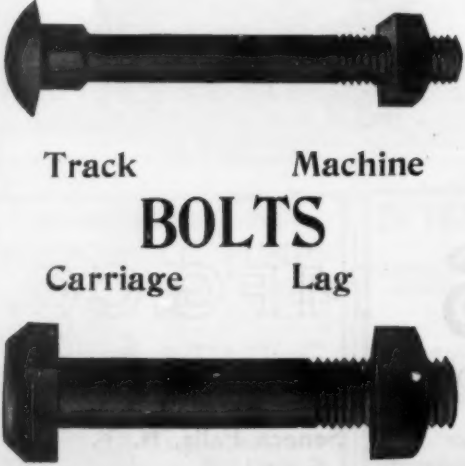
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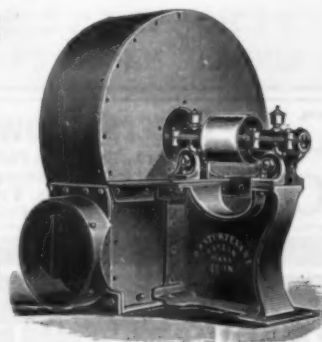
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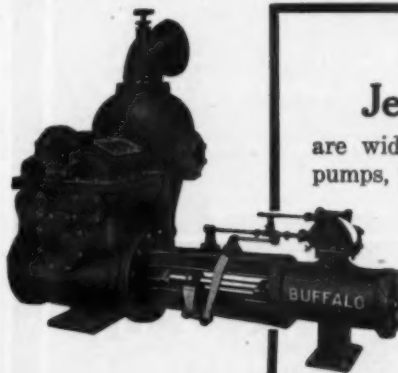
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A WEEKLY SOUTHERN INDUSTRIAL, RAILROAD AND FINANCIAL NEWSPAPER

Trade-Name Registered in the U. S. Patent Office

Vol. LXL No. 7.
WEEKLY.

BALTIMORE, FEBRUARY 22, 1912

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Manufacturers Record.

PUBLISHED EVERY THURSDAY BY THE
MANUFACTURERS RECORD PUBLISHING CO.,
BALTIMORE.

Issued this week in Two Parts—Part I.

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Editor and General Manager.

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ond-class matter.]

BALTIMORE, FEBRUARY 22, 1912.

HIGHWAYS AND RAILWAYS.

A broadminded view of the advantages of good roads is made in a statement recently issued by President W. W. Finley of the Southern Railway Co., who is also chairman of the executive committee of the American Association for Highway Improvement. He makes an earnest plea for the construction of country highways radiating from a market town or a shipping station on a railway as likely to do the greatest good to the greatest numbers. He urges that attention should be first given to the parts of the road immediately adjacent to towns and shipping stations, and that the improvements be extended into the country as funds become available year by year. Such a plan would in time give the country districts good systems of roads of immediate benefit to the farmers, and serving to enlarge the trade of retail merchants to facilitate the work of rural mail carriers and to extend the range of circulation of local newspapers on the day of publication. Falling in with this system of radiating roads would be, in President Finley's judgment, trunk lines and through lines for tourists created by connecting up adjoining systems of radiating roads.

These are practical suggestions, worthy of serious attention on the part of everyone interested in good roads. They furnish a basis for a definite policy in road improvement that places the responsibility where it belongs, upon the people of the locality to be benefited immediately by the improvement. So much is to be done in this direction that there are opportunities for the trying out of a number of policies. Of the 2,100,000 miles of roads in the United States, less than 200,000 miles are im-

proved. The 2,000,000 miles unimproved means actual loss to hundreds of thousands of people, especially the farmers, in hauling their products to markets, and they prevent the enhancement of value of farm properties that would come with first-class means of communication. The spirit of improvement is quite widespread, being manifested in the building of nearly 50,000 miles of improved highways in the five years between 1904 and 1909, and the expenditures now under way averaging probably \$500,000 per day for other improved roads. A number of States have systematized this work more or less, as far as the use of State funds is concerned. But there is still a vast amount of planning to be done, and it looks as though it might be wise for the suggestion of President Finley to have some weight in the planning.

shipping interests of Baltimore. Its publisher, George U. Porter, had been a strong Southern sympathizer during the war, and at the close of that struggle was greatly interested in the betterment of the South and in the development of the business interests of Baltimore and the South. The writer counts it a great blessing to have grown up in that office. During the latter part of 1881 he was instrumental in helping to persuade Mr. Porter to broaden the work of the *Journal of Commerce* by establishing an independent industrial paper devoted to the upbuilding of the South, or to adopt a plan, which appealed more to Mr. Porter, of adding a Southern industrial feature to the *Journal of Commerce*. The latter idea was accepted, and out of it came a 16-page paper called *The Journal of Commerce and Manufacturers Record*, established in the early part of

believe of any other section of any country, and in connection therewith to give the views of men high in public life and great leaders in finance and industry as to the future of this section as they see it. In Part II we believe that we have accomplished this purpose in a way worthy of the South and of what it has and what it has done. We believe that for years to come there will be no other publication which will be drawn upon so heavily by public men in and out of Congress, by business men, investors in this country and abroad, for information about this section.

BUILDING TOWARD THE GULF.

Increasing activity upon the part of railroad companies with respect to traffic outlets via the Gulf of Mexico shows the importance with which they view the approaching completion of the Panama Canal and its expected general effect upon their future. The Louisville & Nashville has just awarded a large number of contracts to provide it with a double-tracked line to Mobile, and the New Orleans, Mobile & Chicago Railroad is preparing plans to revise and reconstruct its road for heavy traffic, as well as to extend it northward for the benefit of the Frisco and the Louisville & Nashville systems, which now control it. Construction has already begun upon part of the Louisville & Nashville's own work, and upon the rest of it the contractors are assembling men and materials. Only a short time will elapse before all of it will be under rapid headway, for it is proposed to complete the big task as fast as possible. A considerable portion of it will be entirely new two-track railroad from Maplewood, near Nashville, Tenn., to Athens, Ala., 110 miles, as hitherto officially announced, and the use of this will accomplish a revolution in operation on the road.

But the very latest move in that portion of the South is a survey for the Illinois Central Railroad, which, according to recent reports from Birmingham, Ala., and Jackson, Miss., has sent out engineering parties from each city to run a line between them. Construction over this contemplated route would give the Harriman system a very direct cross-country line between Birmingham and New Orleans and make it at least partly independent of the Frisco, over whose road the Illinois Central now enters the great mineral district of Alabama from Jasper on the northwest. The energetic course of the Frisco in seeking a Gulf outlet east of New Orleans would seem to account for this activity by the Illinois Central upon the theory that the latter might find dependence upon the Frisco for a Birmingham entrance irksome if the two roads come into strict competitive relations as to Gulf business. This presents food for entertaining speculation respecting the railroad situation in that region.

Another railroad's reconstruction, but west of the Mississippi, is also of especial interest in regard to anticipations

When you have studied Part II of this issue, which, under the general heading of "Thirty Years of Southern Upbuilding," broadly covers the material growth of the South since 1880 in a way in which it never has been covered before, we believe you will want a few extra copies. You will doubtless want a cloth or a leather-bound copy for your library, and you will possibly want a few either in one of these bindings or in paper to be sent to business associates or friends in order to give them more information about the South than they have ever had before. We shall be glad to receive your order as promptly as possible for any number of extra copies you may desire. For less than ten copies order should be accompanied by check. The price is 50 cents a copy in paper, \$1.25 in cloth binding, and \$3 in leather.

CELEBRATING SOUTHERN RENASCENCE.

This issue of the MANUFACTURERS RECORD is published in two parts. Part I is the regular issue of the paper; Part II, under the general heading of "Thirty Years of Southern Upbuilding," broadly covers the material development of the South since 1880, and in connection therewith contains many special articles by noted experts and expressions of opinion as to the future of the South by members of the President's Cabinet and leaders in the financial and industrial interests of the country. Part II is published as a celebration of the thirtieth anniversary of the MANUFACTURERS RECORD. That this happens to fall on the day when the country is celebrating the anniversary of the birth of Washington is interesting, in view of the fact that this issue is really a celebration of the re-birth of the South, when about 1880 it began to emerge from the darkness which had enshrouded it since 1861. In 1882 the MANUFACTURERS RECORD came into being as an enlargement of the *Journal of Commerce*, which for many years had been one of the leading commercial papers of the United States. The *Journal of Commerce* had given great attention to the material interests of the South, although primarily it was devoted to the financial, commercial and

1882. At the end of six months it was seen that there was room for an industrial advocate of the South, and that more progress could be made by publishing two papers, so the *Journal of Commerce* returned to its former shape and its specialty of covering the financial and commercial interest of this city, and the MANUFACTURERS RECORD, under the control and editorship of the writer, was launched as an independent proposition, and in its first issue announced that it would be devoted entirely to the material upbuilding of the South. For nearly a year it needed only deskroom in the office of the *Journal of Commerce*, for in those days there was but little material progress in the South. The world at large had but little faith in the South, and the people of this section had themselves become so discouraged by the disasters of the war and the days of reconstruction which followed that by the hundreds of thousands they emigrated to the Southwest, to the North and to the Pacific Coast.

The achievements of the South since those dark days have been so marvelous that we have felt that the MANUFACTURERS RECORD owed it to this section and to the business world to present the whole story of Southern resources and Southern progress in a more comprehensive statistical compilation than has ever before been gathered of this, or we

of great traffic to follow the opening of the canal. That is on the low-grade line of the Missouri Pacific Railway which was built several years ago under the charter of the Memphis, Helena & Louisiana Railway, and which consisted principally in providing some long connecting links that united several roads of the Iron Mountain division into a direct north and south route between St. Louis and New Orleans. The revision and rebuilding was begun last summer, when an agreement between the Missouri Pacific and the Frisco was almost closed for the joint use and maintenance of the line as a compromise over the alternative of construction by the Frisco of still another road through the same country. But, although the agreement failed on final signature, and the Frisco quickly acquired an interest in the New Orleans, Mobile & Chicago Railroad, the Missouri Pacific is proceeding with the betterment plans and is also building its long-proposed direct route between Marianna, Ark., and Memphis, which is now nearing completion. The finish of this entire work will be of great benefit to the Missouri Pacific, which is awake and expanding under the management of its new chief executive.

As for the big roads farther east, they all have terminals on the Gulf as well as on the Atlantic side. The Southern, the Atlantic Coast Line and the Seaboard are well provided, and the Walters road—the second here mentioned—is about to build a couple of connecting links in the western part of the Florida peninsula to increase its facilities and strengthen its position in that State. Of course, the other two systems may be expected to undertake some physical betterments in preparation for the Panama opening, but as yet their plans are not announced.

One of the most significant steps taken by railroads to increase facilities for reaching the Gulf is the decision of the Chicago, Burlington & Quincy Railroad, in connection with the Frisco and the Louisville & Nashville, to erect a \$3,000,000 bridge over the Ohio River near Paducah, Ky., to make a new through route between Chicago and the Gulf ports. This has been under discussion for a long time, but the authority for bridging the stream has been granted and the War Department has also given its approval, so that all which remains to be done is the actual construction. President Miller of the Burlington says that preliminaries are advancing and within 60 days particulars may be announced. The decision to make such a heavy expenditure at this one point indicates the earnestness and energy with which prominent railroads are preparing to obtain their share of the business that is assured to go via the new route between the seas.

Furthermore, it must not be forgotten that several independent roads are preparing to share in the Gulf traffic. Two of them aim to reach Pensacola, one of them being already under rapid construction and apparently destined to afford a Southern outlet for some large system. This new road, previously described in the news columns of the MANUFACTURERS RECORD, aims to build far up into the interior of Alabama, and another line, upon which some work is also being done, and that has some strong people in it, is to run from Memphis to Pensacola. Then there is the New Orleans Great Northern Railroad, extending from Covington, La., to Jackson, Miss., and which may be gobbled

by some big system that wants to reach the Gulf.

Indeed, the railroad situation with respect to Gulf traffic contains manifold opportunities, and the outlook is for a large amount of new construction, which will be of great advantage to the companies, as well as to the territory that will be developed by it.

SOUTHERN INDUSTRIAL EDUCATION.

An earnest plea for industrial education in the South was made recently by Watt T. Brown of Ragland, Ala., before the Business Men's Club of Gadsden. He said that for an unchecked development of Southern resources and an uninterrupted march to industrial greatness an adequate supply of well-trained, efficient labor is essential, and he added:

There are three essential factors in the development of every industry. These are capital, managerial brains and skilled labor. Through the wealth-producing power of the American people abundant capital for legitimate manufacturing enterprises has been available. The older and well-established schools of technology and engineering have turned out men equipped with managerial brains, but the supply of skilled labor has in no sense been adequate to meet the demands of manufacturers or conserve for the youth of the land the opportunities that come through industrial efficiency.

The South feels in the beginning of her industrial greatness the value of the splendid services rendered by the graduates of her schools of engineering and technology. Also, her agricultural colleges have contributed their share of graduates, who have exerted a wholesome influence on agriculture.

But the most crying need of the South today is for a more general training of the masses of her workers, both in the fields and in the factories.

We have in our midst great beds of iron ore, fields of coal, forests of timber, etc., besides one of the greatest agricultural countries in the world.

The key to this great vault of wealth is industrial education. An education that will teach how to go down into the ground and bring out the raw materials and convert them into the most finished products, instead of sending the raw materials away to other countries, as we are now doing, to be manufactured into high-class products, only to be shipped back to us at high prices; an education that will teach how to take a ton of pig-iron worth \$15 and transform it into the highest-grade steel, valued at more than \$500; an education that will teach how to take the timber from the forests and manufacture it into high-class furniture, etc.; an education that will teach how to take the cotton products (the backbone of the South) and manufacture them into the highest-class cotton goods, as well as all other native products, and not ship the raw materials to the North and East, to be manufactured there into finished products and to be sent back to us at high prices.

Temporarily, the South will have to depend largely upon the attraction from other quarters of trained workers to supplement its native supply in the event of any sudden expansion of industrial activities. Its schools of technology and its agricultural and mechanical colleges, steadily increasing their effectiveness, are training every year a larger and larger number of young men who ought to become leaders in Southern industrial development in the next ten or fifteen years, inasmuch as the South offers them greater opportunities in natural resources than they can find in any other section. But all men cannot be leaders. The great majority of them must be workers in the ranks. Just as it is to the best advantage of the South that its industrial leaders should be the young men of that section, so that advantage will be assured with the industrial ranks filled with young men trained in its schools. The population of the South is not increasing rapidly enough to supply the

demand for skilled workers in the agricultural field of industry called for by the advance made in the science of farming, and for the present at least that demand must be met by drafts upon the rest of the country. In the case of recruits for agriculture and for manufacturing, the temporary resort to other parts of the country must not be permitted to weaken the sense of the necessity to bring into the South the class of permanent population from which in the next generation the skilled workers are to come. As in the rest of the country, so in the South erroneous methods of education have trained the rising generation away from the thought of usefulness and happiness in skilled industry, and have tended to divert young men from the field of production into that of middle man's service, in which the opportunities for a competency are less. The schools have been turning out too many poor clerks, poor bookkeepers, poor lawyers, poor doctors and other poor professional men and too few men skilled in the use of tools or in the handling of machinery. The shortage in skilled workmen in the fields, the foundries and the factories is bound to become more acute unless the training advocated by Mr. Brown and others who have examined the subject carefully be followed and steps be taken to destroy the artificial devices which now prevent young men from entering many of the trades, regardless of the demand for them.

UNMORALITY OF INEFFICIENCY.

That lack of efficiency in furthering material enterprises may be a species of unmorality is rather a novel concept, but the truth in it becomes apparent as one follows the exposition by Harrington Emerson of "the new morality" that will extend man's dominion over uncarpeted energy and its use.* The importance of muscular energy has been greatly lessened by the power of steam and electricity, and the passing of that importance is marked by the substitution for physical compulsion of supervision and co-operation in the handling of machinery and tools. The substitution has happened so quickly that man has not been able to adjust himself completely to the change or to realize fully the new duties and the new privileges inherent in it. Man has yet to master the doctrine of efficiency; that is, intelligent employment of system without permitting system to paralyze initiative. For a number of years Mr. Emerson has been studying this subject from the standpoint of wide acquaintance with the philosophy of human history and intimate knowledge of the details of practice in business and industry. The results of that study are epitomized in one of his latest volumes, in which he argues for an elimination in industrial organization of the destructively offensive type and the development through efficiency of the constructively defensive type. The discussion of the differences between these types and of the necessity for organization and for principles in the attainment of efficiency is an introduction to chapters dealing with the 12 clearly-defined principles of efficiency, viz., ideals, common sense and judgment, competent counsel, discipline, the fair deal, reliable immediate and adequate records, dispatching, standards and schedules, standardized conditions, standardized operations, written stand-

*Twelve Principles of Efficiency. By Harrington Emerson. Publisher, the Engineering Magazine, New York. Price \$2.

ard-practice instructions and efficiency reward. These 12 principles have, in the mind of the author, no narrow limitations, but may be used in testing any human enterprise of a productive character, and, indeed, the concluding chapters of the work indicate how they may be applied in investigation of industrial conditions as a means for the correction of inefficiencies.

Considerable progress has been made in reducing to a minimum the wastes of material in many industrial undertakings and in the economic utilization of materials which were long regarded as wastes. But, after all, this progress is only a beginning of the real accomplishment. The greater wastes through time and energy lost because of imperfect organization or misdirection, however, are still to be dealt with adequately, and when one considers the loss to the human race involved in them he may readily accept the theory that inefficiency is unmorality.

THE SOUTH AND IMMIGRATION.

Indicative of the close tab kept in some quarters upon discussion of the subject of immigration to the South is a letter received by the MANUFACTURERS RECORD from the "Industrial Removal Office," 174 Second avenue, New York city, which seems to be conducted under the auspices of the "removal committee," Reuben Arkush, chairman; Alfred Jaretski, vice-chairman; Nathan Bijur, secretary; Cyrus L. Sulzberger, Eugene S. Benjamin, Max Senior, Jacob Furth and Lucius L. Solomons. Phillip L. Seman, assistant manager of this enterprise, writes:

In an issue of the amendment of immigration laws presented to the Senate by Mr. Overman January 11, 1912, he refers to communications published in the MANUFACTURERS RECORD from Governor Ben W. Hooper of Tennessee, Governor William E. Glasscock of West Virginia and Governor Lee Cruise of Oklahoma, representing the different parts of the United States, emphasize the valuable services rendered to the South by Governor Mann of Virginia, and a clear statement made at Baltimore on the subject of immigration. The issue containing the above information will be very helpful to us in our work. Will you be kind enough to send us this copy at your earliest convenience? The work our office does is closely allied with every phase of the immigration question.

The valuable service rendered to the South by Governor Mann of Virginia in a statement at Baltimore on the subject of immigration was his emphasis of two strong points of especial timeliness—one that we should be particular as to whom we invite to our shores and our territory and the other that each State should be liberal in advertising its resources as attractions for settlers. The communications of the four other Southern Governors emphasized the fact of the necessity for immigration movements to have as a starting point individual State initiative and individual State authority equipped, on the one hand, to resist effectively efforts to use some bureau of the National Government or other agency as a means of scattering over the country the immigration congested in New York city and other centers and thus weakening the effect of a tremendous object-lesson and warning against making it easier for more of such recent immigration to be poured into the country, and, on the other hand, for liberality and intelligent, businesslike methods of making known in the right quarters the advantages offered by the States, of bringing desirable settlers into the States and of providing that they will be satisfied to

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ment of the States.

At the time the MANUFACTURERS RE-
cord said:

Safety for the South and for the country
demands that where there is official partici-
pation in the immigration movement it shall
be limited to State authority, and that any
additional action by the National Govern-
ment shall be confined to making laws in-
creasing the restrictions upon the advent
of undesirable immigrants and relieving the
separate States from restrictions upon their
power to bring in from abroad the class of
immigrants that they feel will suit them
and be suited by them.

There never was a stronger or more deter-
mined co-operation among divers foreign
influences than now to break down the safe-
guards in immigration for this country.
There never was a better chance for the
South to serve the country and to benefit
itself than by presenting a solid rallying
ground for the whole country against these
influences, instead of becoming the unwitting
agency to further their schemes. The ad-
dress of Governor Mann and the communi-
cations of other Southern Governors form
a substantial platform for Southern policy
on the point.

SURE MEANS OF PUBLICITY.

An enterprising business man of Marianna
has bought 3000 copies of the current edition
of the *Times-Courier* and will send the
papers to prospective settlers in various sec-
tions of the country. J. D. Smith, who will
thus spread the news about Marianna and
Jackson county, Florida, has a big advertise-
ment in the *Times-Courier*, and can very
properly expect direct returns. But he is
doing a great deal for his home place, never-
theless, and deserves to be commended and
to have his example followed.—*Florida Times-
Union*.

Mr. Smith has set a good example for
every business man in the South. The
MANUFACTURERS RECORD has often urged
the business people of this section to
mail copies of their local papers to all
their acquaintances and business asso-
ciates in other sections. Literature of
this kind ought to be widely distributed
throughout the country. Many business
concerns in the South have subscribed
for extra copies of this anniversary edi-
tion of the MANUFACTURERS RECORD in
order that they might send Part II,
"Thirty Years of Southern Upbuilding,"
to their correspondents and acquaint-
ances. The wider information of this
kind can be circulated about the South,
the greater will be the progress of this
section.

ARTUMINOUS AND ARTACITE COAL.

The great development of the "briquet-
ting" process of converting bituminous
and anthracite coal braise and culm
into the valuable commercial forms of
"boulets," "briquettes," "coalettes,"
"carbonettes," etc., finds us without
suitable American words to express the
products which are coming extensively
into use. The need for such names as
will express briefly and definitely the
products of the "briquetting" machine
is admittedly great, and the introduc-
tion of such words as "boulets" instead
of "boulets" is becoming noticeable. As
these forms or shapes of coal are pro-
duced artificially, we submit for the ap-
proval of coal producers, dealers and
purchasers of artificially-shaped coal
the shorter and expressive names artu-
minous coal for artificially-shaped bitu-
minous coal and artacite for artificially-
shaped anthracite coal. The usual
numbers or designations may be applied
to different sizes of artuminoous and
artacite coal, so that a complete nomen-
clature is provided by the adoption of
these two self-suggestive names.

THE COTTON MOVEMENT.

In his report for February 15 Col.
Henry G. Hester, secretary of the New

Orleans Cotton Exchange, shows that the
amount of cotton brought into sight dur-
ing 169 days of the present season was
12,293,580 bales, an increase over the same
period last year of 2,157,312 bales. The
exports were 7,440,668 bales, an increase
of 1,522,562 bales. The takings were, by
Northern spinners, 1,533,184 bales, a de-
crease of 130,880 bales; by Southern spin-
ners, 1,558,069 bales, an increase of 159,
584 bales.

THE BALTIMORE BOOK.

City Librarian Wilbur F. Coyle of Bal-
timore has, in the few years with which
he has been connected with the city gov-
ernment, made the City Library an adjunct
of practical value to the municipality. His
intelligence and enthusiasm have changed
it from a mere receptacle of documents
and official publications into a working
exposition of city activities and city his-
tory. His latest achievement is the prepa-
ration of "The Baltimore Book," published
by the municipality in response to the de-
mand for accurate information about the
city, its resources, its general development
and its municipal activities. Within the
130 pages of the little volume, which is
handsomely illustrated with half-tone en-
gravings, is a mass of the definite facts
that the investor or would-be citizen is
anxious to possess. An introductory chap-
ter summarizing the facts of the great
municipal improvements under way is fol-
lowed by brief chapters on a \$20,000,000
sewerage system, a \$15,000,000 water-
works system, the municipal docks, the
factory site commission, the parks, the
public schools, public baths, police and fire
departments, industrial advantages, Sus-
quehanna electric power, financial institu-
tions, commerce and transportation, ter-
minal facilities, living conditions, educa-
tion, climate, health and points of interest,
and, in conclusion, a chronology of events
in Baltimore from colonial days until the
present.

CORRECTIONS.

Mr. C. G. Memminger of Lakeland, Fla.,
notified us after Part II of this issue had
been printed that in his article on page
56 of Part II he had omitted the names of
the Dominion Phosphate Co. and the
Tilghman Phosphate Co. among those
operating in the pebble district of Florida.

Insurance Commissioner Fitz Hugh Mc-
Master of South Carolina notified us,
under like circumstances, that from lines
55 and 56 in the first column of his article
on Insurance in the South on page 80 of
Part II should be omitted the words "and
his influence most powerful, if not con-
trolling, in the other two."

MARYLAND'S BLUE BOOK.

The 1912 edition of that standard refer-
ence book, the Baltimore Sun Almanac,
maintains its record of continued enlarge-
ment of scope and comprehensiveness of
detail that has characterized it since its
first issue in 1876. These almanacs are of
value all the year round to men of affairs,
merchants, manufacturers, farmers and
others as a source of ready reference, and
covering as they do political, financial, in-
dustrial economic and social developments
of Baltimore, Maryland and adjacent
States, they are indispensable to students
of local history.

The Chamber of Commerce of Greens-
boro, N. C., W. O. Burgin, secretary, has
begun the publication of a monthly bulle-
tin designed to be a dynamo of work
promoting the best interests of the asso-
ciation, and through it the welfare of the
city. The first issue contains a list of the
348 individual and firm members of the
Chamber.

President Wheelwright on Coal Development.

VAST OPERATIONS IN EAST KENTUCKY CALLING FOR
EXPENDITURE OF MANY MILLIONS.

The greatest coking-coal development
ever undertaken in the world is doubtless
that of the Consolidation Coal Co., which
is now opening up on a gigantic scale its
100,000-acre tract in the heart of the Elk-
horn field of Eastern Kentucky, accounted
by many to be the best coking coal known in
the world and a region which is destined
to have a far-reaching influence upon the
development of the iron and steel inter-
ests of America, for high-grade coking coal
is as essential as the iron ore itself, and
the supply of coking coal is doubtless less
than the supply of iron ore.

The purchase and development of this
coal property, and the railroad construc-
tion necessary to provide the facilities that
will be needed for the handling of the coal,
will represent an aggregate outlay of prob-
ably \$40,000,000 to \$50,000,000, the Louis-
ville & Nashville Railroad alone having
work now in progress for the construction
of its line into that territory at a cost
which will probably reach \$18,000,000.

Mr. J. H. Wheelwright, president of the
Consolidation Coal Co., in an interview
with the MANUFACTURERS RECORD about
the work which his company is doing in
the Elkhorn field, said:

"The 100,000 acres of land purchased
by the company lies in the eastern part of
Kentucky and covers portions of Pike,
Letcher and Knott counties. The principal
workable seam, the Elkhorn No. 3, has
a comparatively high elevation, and it is
only at the heads of the principal
streams that it is approached at water-
level. At the point where the watersheds
of the Kentucky River and the Big Sandy
River divide there is a large unbroken
area of this seam, and it was to this point
the railroads were directed for its most
compact and economical mining. The en-
tire area of the field is practically equally
divided between the Kentucky and Big
Sandy rivers. The topography of the
country is mountainous, but the approach
by railroads to desired points is made by
easy grades.

"The eastern portion of the property,
on the Elkhorn and its tributaries, will
be served by the Sandy Valley & Elkhorn
Railway, a line 40 miles long, which is
being built by our company, from a con-
nection with the Chesapeake & Ohio at
Shelby Junction, on the Big Sandy divi-
sion. The Consolidation Coal Co. has a
contract with the Baltimore & Ohio Rail-
road Co. by which the latter agrees to
equip the Sandy Valley & Elkhorn Rail-
way with the necessary cars and motive
power to move the output of the mines on
that road, which it is estimated will not
be less than 3,000,000 tons within two
years from the date of the completion of
the road. Two thousand all-steel cars of
100,000 pounds capacity have already been
ordered and are now being built.

"The Louisville & Nashville Railroad
Co. is building a line from Jackson, Ky.,
into the property, a distance of 98 miles,
which the engineers estimate will be com-
pleted by August 1 of this year. This
line will reach and serve the southern
and western side of our property on the
Kentucky River and its tributaries. Mr.
M. H. Smith, president of the Louisville
& Nashville, stated in the beginning that
the cost of extending his road and equip-
ping it with the necessary rolling stock
to take care of the output of our mines
which it is intended to serve would cost
\$15,000,000, and I understand that esti-

mates made since put the cost at \$3,500,-
000 more. You can see at a glance that
the provisions being made for this field
involve large sums of money, and that we
are absolutely assured of our transporta-
tion necessities, which form the largest
factor in the development of a coal prop-
erty of the size and character of the Elk-
horn field. The terminals of the two
roads as at present proposed will be about
two miles apart, but it has been proposed,
though not authorized, by the Louisville
& Nashville Company to connect the two
by means of an additional line of some
six miles and a short tunnel. Such a con-
nection would give the Louisville & Nash-
ville a route down Elkhorn Creek to what
is known as the 'Breaks of Sandy' and an
ultimate connection with the Chesapeake
& Ohio Railroad and the Clinchfield, Car-
olina & Ohio when completed.

"It is the intention, as far as possible,
to concentrate the operations about a cen-
tral point. This plan resulted in locating
the town of Jenkins, which will have the
general offices, the main store, the bank
and the residences of the officials, and
which will be the general distributing
point for all the operations. Here, too,
will be located the central power plant,
with an ultimate capacity of 10,000 kilo-
watts. The water supply for power gener-
ation will be assured by the construction
of an impounding dam with a capacity of
some 40,000,000 gallons. A secondary dam
and reservoir, which have already been
constructed, and which will be fed by
mountain springs, will supply, by gravity
flow, the domestic needs of the residents
of the town. This town, known as Mc-
Roberts, will be built on Wright's Fork,
which will be the principal community of
the Kentucky River development.

"Tipples have been built, mines opened
up and entries started on lines that at
this time are considered best. Machines,
motors and other mechanical appliances
tending toward large capacity and econ-
omy in production will be installed. All
power to all plants at present proposed
will be supplied from the central plant at
Jenkins. Tenement-houses of good con-
struction and of various sizes are being
built for the miners and laborers. It has
been the intention, and it is being carried
out, that the company should own all the
surface lands at and contiguous to the
various mines, which will enable it to pre-
vent outside influence from interfering
with the mining operations.

"At this time eight mines have been
opened up and entries driven in order to
have sufficient development for the con-
templated output when the railroad is
completed. Seven tipples are in process
of erection, while machine shops, black-
smith shops, stables, etc., at the various
mines are being rapidly provided. Some
200 miners' houses have been completed,
and there will be probably 300 or more
finished by the time actual coal loading is
begun.

"Six large mines have been located on
Wright's Fork, on the Louisville & Nash-
ville's extension, and these are being
opened up and entries will be driven so as
to enable the company to commence ship-
ments on this side of the field as soon as
the Louisville & Nashville road is com-
pleted, which will be the first of the com-
ing August. This will make a total of
14 mines.

"We have had to cut timber, install five

sawmills, erect brick plants, planing mills and drykilns, construct roads for the transportation of materials, machinery and supplies, and erect temporary dwellings for the workmen. Little idea of the difficulties of the situation can be given by a mere verbal description to anyone not acquainted with the character of the country and the great extent of the operations. But everything is now so nearly completed that when coal loading begins the mines on the Sandy Valley & Elkhorn Railway will be prepared to produce 2500 tons of coal a day.

"Previous to the purchase of the lands they were investigated by numerous experts and also by the engineers of our company, the reports made by whom agreed in all essential points and without exception pronounced the field one of remarkable integrity of thickness of seam and character and quality of coal. The coal seam, which is from six to nine feet in thickness, has an outcrop practically around the entire field. The examination of the property was therefore made easy, and particularly so as numerous openings had been made. However, when mining was contemplated, diamond drill holes were put down in various widely-separated parts of the field for the purpose of verifying the elevation and other information inferred from the crop examination, and also to test the uniformity of the seam. In fact, these drill tests are still being made. The results have further verified previous conclusions of moderate grades, and have furnished information on the quality of the coal free from possible weathering of crop samples. Since the mine openings have been made and entries driven more opportunity has offered to test the quality of the coal and the thickness of the seam, and the conclusions of the experts and engineers have been still further borne out.

"We have had many analyses of these coals and also various mine openings made and they show an average percentage of 1.76 moisture, 34.21 volatile matter, 60.53 fixed carbon, 3.50 ash, .62 sulphur, .005 phosphorus, with 14.425 B. T. U. This fixes its status as a gas coal of exceptional purity. It is also a fine coking coal, and this feature opens to it wide markets for metallurgical processes. It is in the by-product process for making coke or gas as the primary product that this coal will fill a long-felt want for a pure gas coal. It is now recognized universally that a by-product plant for making coke is essential to blast furnaces in the manufacture of pig-iron for competitive markets. The Middle West has for years been supplied with natural gas for domestic fuel, but this source of supply is rapidly failing and never was sufficient for the demands of the market. Those who have once used gas as a domestic fuel demand gas in future, and the only economical source is the by-product oven. Numerous by-product plants are now operating with fuel gas as the principal product, and others are being built. The Elkhorn coal, applicable to the manufacture of the purest metallurgical coke, and unexcelled by any other coal for gas-making purposes, should have almost unlimited market, not only displacing similar coals of less purity, but by reason of the extended growth of the by-product business, displacing such coals as are now used for ordinary domestic and steam purposes.

"Immediately after the property was purchased instructions were given our engineers and operating officials to proceed with such development as they found necessary to provide a production of 7,000,000 tons annually, and to so expedite the work as to enable us to actually produce and ship within two years from the

date of the completion of the transportation line at the rate of 3,000,000 tons annually. To handle this greatly-increased output the sales organization has been enlarged and strengthened in preparation for marketing. Headquarters for the Western sales division have been established in Chicago, with a trained and efficient staff, and plans are laid for making a complete and thorough canvass of all territory available for this field. The coal will be distributed through the great Middle West, in which the shorter distance to be hauled and the lower freight rates should give it considerable advantage over that from either the Pocahontas or the Connellsville fields, from which comes the only coal that would be competitive for this high-class business. Taking all these together, we think we are justified in our belief that we are now developing the greatest undeveloped coal field in the country."

This is the story, simply told, of this coal development, which, as stated, is doubtless the greatest ever undertaken in the world. That is to say, no other single company ever began a development with the fixed intention from the start to produce so large an amount of coal, outlining its plans from the beginning and bending all efforts to their consummation. To produce 7,000,000 tons of coal a year means that there must be produced on every working day of that year almost 25,000 tons, and as mines cannot be counted on to run more than two-thirds of the time, it means that while running they must produce more than 30,000 tons daily. An average of six tons to the miner for each day's work would mean the employment of 5000 men to mine a 30,000-ton output. These would be the miners alone, and for handling the coal from the time it leaves the miners' rooms until it is loaded on the cars, and in operating the many departments of a mining plant, in addition to the actual mine itself, there would be required almost as many more men and boys, so that the number employed in the operation of these Elkhorn mines will be somewhat like 8000 or 9000. Add to these the families of such of the men as have families, and we find that there will be a population thrown at once into what a year ago was an entirely unpopulated territory of anywhere from 25,000 to 35,000 people.

Not only so. A year ago the land now being developed by the Consolidation Coal Co.—a boundary practically 40 miles square—was an unbroken wilderness, lying idle, producing nothing, giving up nothing for the wealth or comfort or convenience of mankind. Now it is alive with humanity, active with enterprise, rapidly approaching the time when it will send out its millions of tons of heat and power potentiality to bear a part in the general advancement of human enterprise and industrial progress.

The story covered by Mr. Wheelwright's interview is one of the most striking ever told of the great game which modern business is, and yet it is related by the commanding general of the fighting forces in a manner so simple and matter-of-fact that one must look deep under the surface of the mere words to recognize the tremendous significance of the things described.

For 25 Miles of Road.

Proposals will be received until March 14 for grading, draining and macadamizing or graveling 25 miles of road in Caddo parish, Louisiana. The Caddo Parish Police Jury at Shreveport will receive the proposals. Specifications, profiles, etc., are on file with J. T. Bullen, parish engineer.

7 VAST DRAINAGE PROJECTS.

Contracts Awarded for Reclamation of Nearly 200,000 Acres.

The Commissioners of Drainage District No. 9, Mississippi county, Arkansas, have awarded contracts for the drainage of the district, which embraces nearly 200,000 acres of the most fertile land in North-eastern Arkansas. The contracts call for the construction of 292 miles of ditches from 14 to 40 feet wide on the bottom and from 8½ to 14 feet deep. The district will construct also 22 steel and 17 wooden bridges, as well as concrete spillways and other structures costing several thousand dollars. The Morgan Engineering Co. is engineer for the district, and has been working on the plans for over a year and a half. The ditches are planned to fully reclaim nearly all the land in the district, and are located a mile apart, as a rule. Each tract of land can thus reach an outlet ditch with very little lateral ditching.

Practically every drainage contractor in the country was personally informed of the letting through the mailing list maintained by the Morgan Engineering Co., and besides the district secured a great deal of publicity through the press. The result was that every contractor who was open for work was present at the letting, and over 35 qualified to bid by presenting a check or bidder's bond.

The excavation work is divided into 16 contracts which are laid out so that each can be constructed with one machine. Fifteen of the sixteen contracts contain about two years' work for one machine. Contract No. 9 is so situated that only one small ditch could be constructed with one set up of a machine, and so contains only about 100,000 cubic yards. It will probably be constructed with a drag-line machine. Contracts 1 to 8 and 10 to 15 are designed for and will be constructed with floating dipper dredges. Contract No. 16 is on high ground, and is designed for a dry-land machine. Each of the contracts was let for a low figure, considering the construction problems to be met on the individual contract. Two of the best were let for less than six cents per cubic yard. The average price for the whole work is seven cents per cubic yard. This price was secured largely from the fact that the wide experience of the engineers in charge of the work enabled them to meet and solve many of the uncertainties that attend the construction of dredge ditches. The comparatively small amount of money that was expended in securing engineering data that is usually not available probably saved the district many thousand dollars in enabling the engineers to prepare the most economical plans possible and in giving the contractors reliable information concerning the conditions to be met in executing their contracts.

The contracts for the excavation work have been awarded as follows:

Contract No.	Contractor.	Price per yard.		Total cost.
		Cents.	Yardage.	
1.	George W. McCarter, Warsaw, Ind.	7.90	871,400	\$68,877.00
2.	George W. McCarter, Warsaw, Ind.	7.90	1,117,500	\$88,282.50
3.	Engel Bros., Nettleton, Ark.	6.90	769,300	\$53,171.07
4.	Forrestal & Feyen, St. Paul, Minn.	9.00	607,500	\$54,675.00
5.	National Drainage Co., Alexandria, Minn.	5.93	1,598,400	\$94,785.12
6.	Otto Kochitzky, Cape Girardeau, Mo.	8.00	1,012,600	\$81,008.00
7.	J. S. Kochitzky, Cape Girardeau, Mo.	7.45	823,000	\$61,358.20
8.	Otto Kochitzky, Cape Girardeau, Mo.	6.35	947,300	\$60,153.55
9.	R. H. & G. A. McWilliams, Chicago, Ill.	11.25	200,000	\$11,250.00
10.	National Drainage Co., Alexandria, Minn.	5.70	949,400	\$54,115.80
11.	Otto Kochitzky, Cape Girardeau, Mo.	6.30	1,044,600	\$65,809.80
12.	Otto Kochitzky, Cape Girardeau, Mo.	6.35	1,238,300	\$77,997.05
13.	Foehy Dredging Co., Fort Wayne, Ind.	7.00	618,400	\$43,288.00
14.	Foehy Dredging Co., Fort Wayne, Ind.	7.00	863,000	\$60,410.00
15.	Otto Kochitzky, Cape Girardeau, Mo.	6.30	1,156,000	\$72,865.80
16.	Forrestal & Feyen, St. Paul, Minn.	11.50	252,200	\$29,003.00
Totals.....			12,993,100	\$979,939.40

The class of equipment to be installed as well as the price bid was considered by the commissioners in awarding the contracts, and they were awarded to contractors who are prepared to install the best of equipment and start the work promptly. It is understood that at least two 4½ cubic-yard dipper dredges will be

installed on the work. These machines will be the largest which have ever been used on this class of work in the Mississippi Valley, and it is expected that they will excavate from 80,000 to 100,000 cubic yards each month. The specifications require that the largest ditches be excavated at the average rate of 40,000 yards per month and the smaller ditches at the rate of 25,000 yards per month, and it will be necessary to install first-class equipment to maintain this rate of work.

The contracts call for beginning the work within six months after the sale of the bonds. Bids were received for the bonds on February 14, and it is expected to close the sale at once.

The equipment to be installed on this work will be the best that has ever been used for drainage construction in the lower Mississippi Valley, and will mean much to the reclamation of the surrounding territory. It is expected that the construction in drainage district No. 9 will require two and a half years. At the end of that time these machines will be prepared for other work.

The example that the reclamation of this district will set will be highly advantageous to the cause of reclamation in the South generally. Thorough surveys were made and the work carefully designed to secure the best possible results, so that when the ditches are complete it will be possible to secure a crop off of almost every acre in the district every year. As this is one of the most progressive regions in the South, all of the land in the district should be in a high state of cultivation within a few years. Cultivated land on the highest ridges along the Mississippi River front now sells for from \$100 to \$150 per acre, and all land within the district is almost equally fertile.

Outlook for Mississippi.

Business League,

Greenwood, Miss., February 12.

Editor Manufacturers Record:

Quite a few Northern people have been down through this section prospecting and some buying lands lately. So we have no room for complaint as to business, like many sections. Yet some of our folks are a bit scared about the boll-weevil, and some few turning their lands loose below their real value, as they are not willing to try anything but cotton themselves. Yet they see others making more money on corn, hay, rice, alfalfa, hogs, cattle and other things than they ever made on cotton. There is no doubt that Mississippi is destined to be one of if not the leading farming and stock-raising State in the Union within the very near future, and if the Northern and Eastern farmers knew the natural advantages offered here above their country I believe they would flock in here so fast that the values of our lands would rise as none has ever done in any other section of the United States. Thou-

sands have read much about the Mississippi Delta, but really know but little. If they could only see for themselves they would readily see that half has not been said that could be, and that the possibilities are far greater than have been pictured by any man's or men's advertising.

G. W. CARTER, Secretary.

SOUTHERN PROGRESS

THE FUTURE OF THE SOUTH AS A FIELD FOR INVESTMENT AND DEVELOPMENT.

By CHARLES B. EDDY, New York.

Aside from agricultural pursuits there was comparatively little development in the South prior to the Civil War, and immediately thereafter even that industry was paralyzed so that for years following it was to an extent shunned and was not sharing in commercial, mining and manufacturing activities incident to the North and West.

Startling as it may seem, while true values in the South had increased 78 per cent. in the 10 years prior to the war, such values increased but 19 per cent. in the whole 20 years succeeding the war. This notwithstanding the rest of the country in that period increased 206 per cent.

At length, however, the advantages for manufacturing and the dormant natural resources of the South in its minerals, timber, water-powers, etc., began to be seen, and capital was not slow to recognize in it a vast new field for profitable investment, development, and therewith commercial growth kept more than even pace.

In the 20 years from 1880 to 1900 the annual value of the products of manufacturing in the South increased 219 per cent. as against 135 per cent. in the rest of the country, and in 1900 the total value of Southern factory products was nearly \$3,000,000,000, or equivalent to the assessed value of the entire South in 1870.

Timber was another opportunity which long awaited the hand of industry, and now, although cutting more timber than

all the rest of the country combined, it still has 45 per cent. of all the standing timber of the United States.

Turning now to those resources resulting from discovery or from scientific achievement, notably coal, iron and water-powers.

The Appalachian portion of the South has demonstrated that it has coal and beds of iron ore in inexhaustible supply, and at Birmingham and other favorable points iron can be produced at less cost than any place in the world.

The potential possibilities of hydro-electric power in this Appalachian region are second only to those of the great Northwest, and one city alone, viz., Chattanooga, Tenn., has now being delivered and in contemplated development 221,000 horse-power, as compared with the 72,000 horse-power generated at Niagara.

This affords a brief suggestion of the vast opportunities for development and growth in the South. Her natural resources have been but so slightly scratched that they attach but trifling value except for use. Hence coal lands command but a nominal price of about \$15 to \$25 per acre, and comparative prices for iron-ore lands.

Everywhere the welcome hand is extended to settlers and to capital to come and take and use, and there are no Federal bureaus to hamper, annoy and throttle enterprise such as now blight and wither the spirit of progress and development in the public-land States.

MATERIAL DEVELOPMENT OF THE SOUTH AND INSURANCE.

By ELBRIDGE G. SNOW, President Home Insurance Co., New York.

I am pleased to have the opportunity of responding to your invitation to express my opinion about the future of the South as a field for investment and development, based upon its natural resources and geographical location.

With respect to the progress of that section during the last 30 years, while I cannot altogether speak of it, like Aeneas, as "all of which I saw and part of which I was," yet I believe that my position as an underwriter has given me a fairly accurate and thorough knowledge of the situation.

It is the policy of the company which I have the honor to serve to plant an agency at every available point. By this I mean every desirable city and town in which a reasonable business might presently be done or from which a profitable revenue might be expected in the near future. At the close of 1881 the company, through its Southern department, was represented in 307 agencies, and the insurance written through those offices in that year amounted to \$34,392,764. At the close of 1911 in the same district the company was operating 1625 agencies and the insurance written totaled \$382,105,870. At this point it is interesting to observe that the 1881 premiums were \$375,808.65, showing an average rate of \$1.00 per \$100. The premiums for 1911 were \$2,734,160.88, and the average rate was, as you can see, a little less than 72 cents per \$100. This shows how insurance rates have been lowered by improved construction and more efficient fire protection. Without going extensively into further statistics, it seems to me that these figures, showing not only a greatly increased number of available agency points, but also the larger values, speak clearly of great progress and development.

Some of the causes that have brought this about have manifested themselves to one who in the position of an underwriter finds it important to keep in touch with the changing conditions and developing industries.

At the beginning of this tri-decade period the coal output of the South was a negligible matter, while now Virginia, West Virginia, Alabama and Tennessee are furnishing large quantities of steaming and other coals of a superior quality, while Alabama has taken a prominent place in iron and steel production. In South Carolina there was an important rice yield, which now has been many times multiplied in the great development of that product in the States of Arkansas, Louisiana and Texas. South Carolina then furnished phosphate fertilizer to the country, which still continues to be important in the upkeep of farm fertility, but has been more than doubled from the discoveries of an equally good and perhaps superior yield in the State of Florida. Natural gas, practically unknown, is now common and supplied in large measure in West Virginia, Louisiana and Texas. Millions of dollars in petroleum have flowed in Oklahoma and Louisiana and Texas. Exquisite marbles are quarried in Georgia and Alabama. Turpentine and rosin, which were in a measure limited to North Carolina and thereabouts, are produced in all of the States between that and Florida. At the beginning of this 30-year period the belief of many that cottonseed was good for other purposes than a limited use for fertilizing was taking practical shape, and mills for the manufacture of the oil contained in the seed were being built, but it was scarcely imagined what a splendid development the future held in this direction.

The adaptability of Florida for the growth of early vegetables to supply the markets of less favored districts was not fully known, neither were the growth possibilities of the Texas black lands appreciated or employed to a sufficient extent, nor was Sir Walter Raleigh's discovery of the valuable potato and Virginia's wonderful capability in its production developed in an adequate measure. Incidental to these productions has come the establishment of great terminals at Norfolk, Savannah, Galveston, New Orleans and other points. Thousands of miles of good roads have been built and are increasing rapidly.

All of these developments, including the staples cotton and tobacco, as well as peanuts in Virginia, sugar in Louisiana and oranges in Florida, I have watched and observed in my capacity as an underwriter concerned with the duty of affording protection against loss by fire of the

FAITH IN SOUTH SHOWN BY INVESTMENTS.

By STONE & WEBSTER, Boston.

We have had unusual opportunity to observe the development of the Southern States. The Stone & Webster Management Association is now managing public-service companies in 13 large communities well scattered over the territory and located at Tampa, Columbus, Savannah, Jacksonville, Key West, Pensacola, Baton Rouge, Houston, El Paso, Dallas, Galveston, Fort Worth and Beaumont. The Stone & Webster Engineering Corporation is engaged in furnishing to the wide Southern field its services in designing

physical values of the communities in which the company does business.

At the beginning of this period the sectional animosity operated to the mutual disadvantage of the South and its neighbors, and many problems were unsolved. Some of them are still awaiting solution, but many of them with final settlement either in sight or with progress in that direction.

Well-developed agricultural schools have taught the planters better methods. Mechanical and industrial institutes have helped whites and blacks, and treasures put in forest and field by the great Architect and Builder of the world are being used by the hand and brain of man.

This review is, of course, incomplete and short of any adequate expression, but the progress and utilization of the values now existing have been so great that one is abundantly justified in forecasting a great and splendid future for the South.

Austin Improvements.

Business League,
Austin, Tex., February 15.

Editor Manufacturers Record:

The city has recently purchased \$58,000 of its outstanding bonds and is in the market for \$25,000 more. A telegram was received from New York on the 13th announcing the fact that our great dam would be completed in the early fall. This is great news to Austin, as it is believed that the completion of the dam and the securing of the great 27-mile lake will mean a new era for Austin.

At least 5000 feet of street paving have been ordered for South Austin, the beautiful addition of Austin, lying across the bridge, and a great improvement has been shown in the new buildings and improvements of properties in every line. Four new buildings have been recently erected to be used as modern garages. Austin now has 700 registered automobiles.

A business men's accident insurance company is being organized in Austin, and it is expected a charter will soon be taken out and an office opened here. The auto hose cart and chemical engine will be here today, and it is expected that this will be a starter toward a fuller and better equipment of the fire department with auto appliances. The movement for an auto loop road around Austin is meeting with great success and secured the co-operation of both the city and the County Commissioners. Work is being done in macadamizing and putting in first-class shape this road, and when completed it will be perhaps the best auto road in Texas. A bond issue will be submitted to the people of Austin in a short time to provide for increased sewerage, improved streets, new school buildings and an addition to the cemetery. It is expected that the amount voted upon will aggregate \$7000. WILL L. VINING, Secretary.

Zinc Spelter in 1911.

In 1911, according to a report made by C. E. Siebenthal of the United States Geological Survey, 286,526 tons of pri-

mary zinc spelter were produced in the United States, an increase of 17,342 tons over 1910. The consumption was 280,039 tons, an increase of 34,179 tons. The world production was 974,385 tons. Of the United States production from domestic ores Missouri produced 127,540 tons, more than any other State; Arkansas, 385 tons; Kentucky, 205 tons; Oklahoma, 2247 tons; Tennessee, 1000 tons, and Virginia, 228 tons—a total of 131,005 tons in the South. In the past five years Missouri has produced 674,347 tons, or 57.7 per cent. of the total production from domestic ores.

Mussels in Caddo Lake.

[Special Cor. Manufacturers Record.]
San Antonio, Tex., February 15.

Caddo Lake, which covers almost 40,000 acres in the northeastern part of Texas, is to be protected and developed in its fish resources and pearl findings, according to plans of the State fish, game and oyster department. All manner of taking fish except by pole and line will be forbidden, and a deputy will be placed in charge of the lake to see that the regulations are enforced. Commissioner W. G. Sterett says there is no finer field anywhere for the fisherman and sportsman, but the fish supply has been depleted by the use of nets and other means for taking the fish, which now are prohibited. A State fish hatchery may also be established on the lake. Restrictions will be placed, too, on persons hunting in the lake for pearl-bearing mussels. Since last summer, when a very valuable pearl was found in this lake, between 300 and 500 persons have been pursuing this occupation nearly as a trade, and persons throwing the mussels back in the lake after opening the shell in search of pearls have corrupted the water and killed many of the mussels. Hereafter mussels may be taken only by hand and must be opened on the shore. The shells will be sold for the manufacture of buttons and shell ornaments.

The National Oil Mill Superintendents' Association will hold its next annual convention at Memphis, Tenn., June 12-14.

Types of Improved Highways in the South

ILLUSTRATIONS OF VARIETY OF MATERIALS USED AND DIFFERENT METHODS OF CONSTRUCTION



SAND-CLAY ROAD NEAR TROY, ALA.



U. S. OBJECT-LESSON MACADAM ROAD, FORT SMITH, ARK.



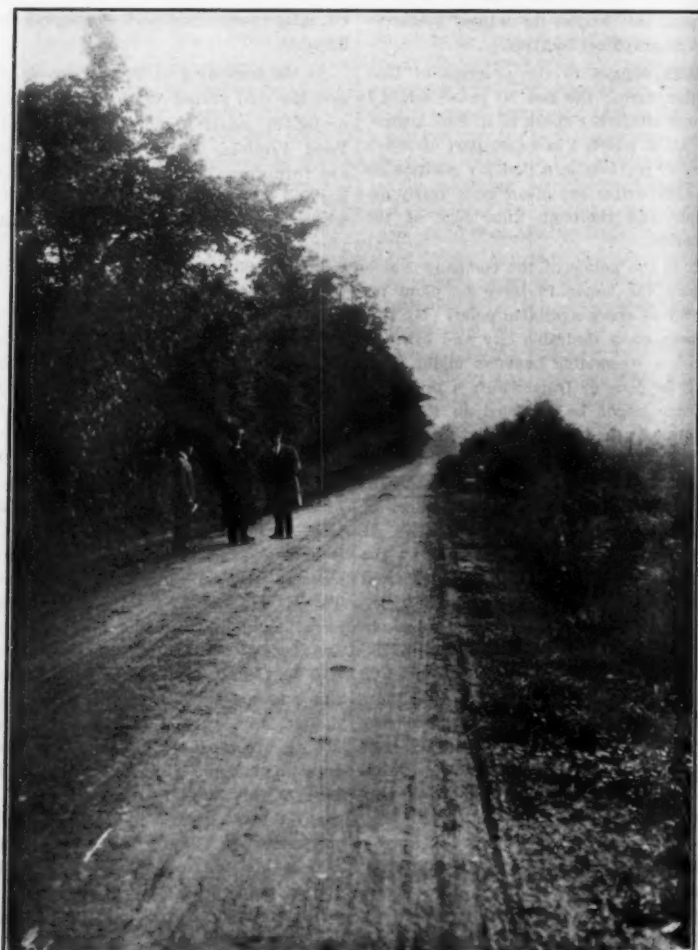
SAND-CLAY ROAD NEAR SAMSVILLE, FLA.



MACADAM ROAD NEAR MIDDLESBORO, KY.



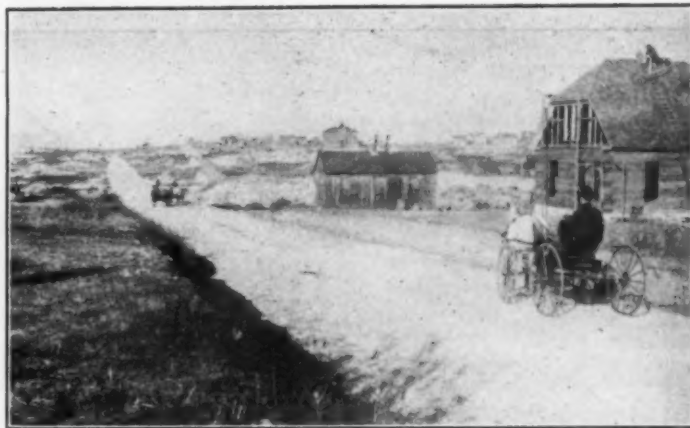
GRAVEL ROAD NEAR SAVANNAH, GA.



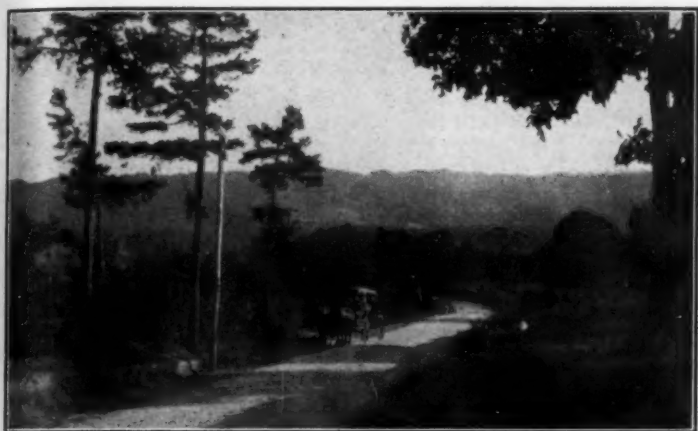
BITUMINOUS MACADAM ROAD ON THE EASTERN SHORE OF MARYLAND.



GRAVEL ROAD NEAR ALEXANDRIA, LA.



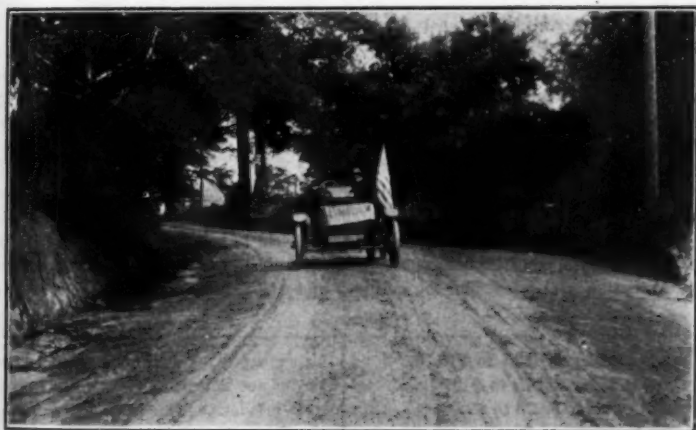
MACADAM ROAD BUILT OF CHATS (A BY-PRODUCT OF ZINC ORE), JOPLIN, MO.



MACADAM ROAD NEAR ASHEVILLE, N. C.



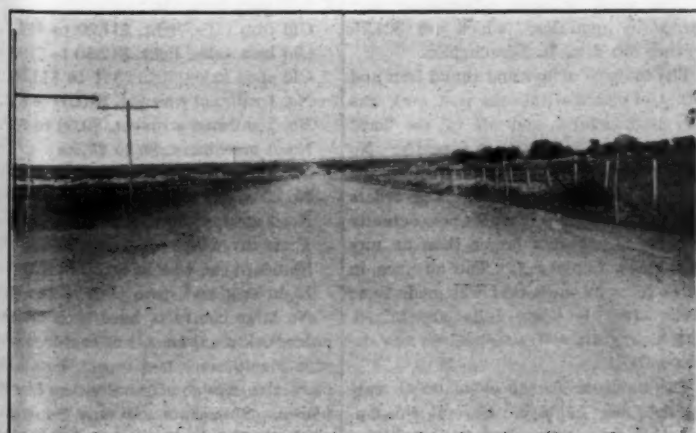
A NEW ROAD IN THE STATE OF OKLAHOMA.



SAND-CLAY ROAD NEAR DARLINGTON, S. C.



MACADAM ROAD IN HAMBLIN COUNTY, TENNESSEE.

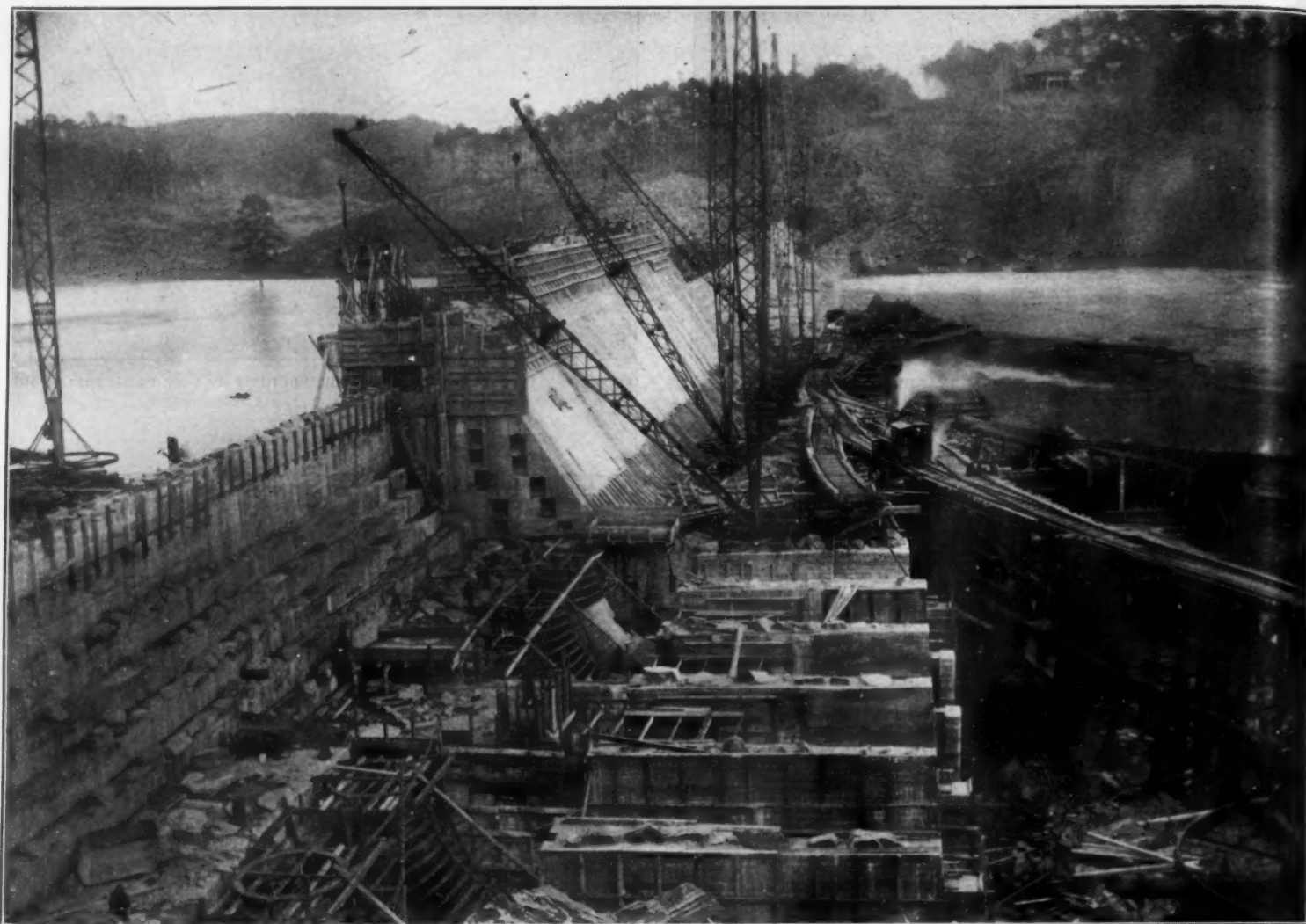


BITUMINOUS MACADAM ROAD, EL PASO, TEX.



GRAVEL ROAD NEAR PETERSBURG, VA.

GOAT ROCK DEVELOPMENT OF THE COLUMBUS POWER COMPANY.



Goat Rock is on the Chattahoochee River about 15 miles above Columbus, Ga., and the power ultimately to be developed is 30,000 kilowatts. The present construction consists of the elevation to 70 feet of an impounding dam, which had previously been built of such section as to permit this operation, the installation of two units of 3000 kilowatts with the necessary auxiliaries, a power station at the site of the dam, and a high-tension transmission line to Newnan, Ga., via Lagrange and West Point, a total distance of 64 miles. The transmission line will be of steel tower construction with spacing for 110,000 volts, but the present voltage will be 66,000. In the power station there will be installed two 11,000-volt 60-cycle 3-phase 3750 K. V. A. generators, with necessary auxiliary equipment and transformers of 4000 K. V. A. capacity for raising the voltage for the transmission line. The only unusual feature of the work is the river span, which is about 1500 feet, calling for steel cabled and special insulating arrangements. The dam is being built of cyclopean concrete, gravity section. The original impounding dam contained 45,000 yards of concrete, and the additional construction would bring the total amount of concrete placed up to 130,000 yards. The construction has not presented any especially remarkable features, but the site is isolated, so it was necessary to build a standard gauge spur road, seven miles long, connecting with the Central of Georgia Railway, in order to get in the construction materials and machinery. This line was connected with an elaborate system of tracks in the river bottom by a cable-operated switchback. The impounding dam was built in the first place by means of a timber crib cofferdam in two sections, the first of which took in two-thirds of the river width, and was designed to permit the passage of 30,000 second feet without damage. The work of building the power-house foundations and additional cofferdam of timber cribs and earth fill has been necessary. The design and general supervision of the work are in the hands of the Stone & Webster Engineering Corporation of Boston, and the masonry and excavation have been done under a subcontract by B. H. Hardaway of Columbus.

BIRMINGHAM IRON MARKET.

Indications of Greater Strength During the Past Week.

[Special Cor. Manufacturers Record.]

Birmingham, Ala., February 19.

Producers' revised asking prices for foundry grades of pig-iron are being adhered to, and the market for shipments during the remainder of the first half is considered firm at \$10.25 to \$10.50 per ton at furnaces for No. 2 foundry. The tonnage so far placed at the advance is comparatively small in the aggregate, but the inquiry that has come forward with the indications of a stronger market is very gratifying. At this time a very liberal tonnage in lots ranging from 750 to 1000 tons each is pending, and quotations have just been requested on larger tonnages, the delivery of which, in some cases, extends through the third quarter. For this last mentioned a price has not been established, but a schedule of \$10.50 per ton for No. 2 foundry has been mentioned in offers. The largest sale reported for the past week involved 800 tons of No. 2 foundry for shipment in the remainder of the first half at \$10.50 per ton Bir-

mingham. A number of carload lots were also sold at the \$10.50 per ton price, and no tonnage was reported sold at lower figures. It is understood that a limited tonnage for spot shipment can be had at \$10.25 per ton Birmingham for No. 2, but reference is made to one brand only. The demand for the lower grades continues very strong, without an increase in the tonnage available. It is noted that certain furnace yards are depleted of all grades below No. 3 foundry and that the percentage of high grades now being produced is rather phenomenal. A lot of 400 to 500 tons of standard charcoal iron was sold in the week at prices in line with those quoted, which is for shipment as required in the first half. It is probable that one of the two stacks now in operation on charcoal will undergo repair in a comparatively short time, and it is not known definitely just when the stack now idle will be put in blast. No change in the situation relative to basic iron is reported. All grades are quoted as follows per gross ton f. o. b. cars Birmingham district furnaces for any delivery prior to July 1, viz.:

No. 1 foundry, \$10.75 to \$11.

No. 2 foundry, \$10.25 to \$10.50.

No. 3 foundry, \$9.75 to \$10.

No. 4 foundry, \$9.25 to \$9.50.

Gray forge, \$9 to \$9.25.

Standard basic, \$10.25 to \$10.50.

Off basic, \$9.75 to \$10.

Standard charcoal iron, \$22 to \$23.

Additional sales of light rails were made in the week without establishing any change in quotations, which are \$27.75 per net ton f. o. b. Birmingham.

The tonnage of bar and round iron and soft steel placed within the past week was very satisfactory, and all of the local mills continue to operate to capacity. No further mention is made of shading the established base price for the large orders offered, and the new business now actually in sight is probably larger than at any time since January 1. The advance in prices for wire nails that was made some weeks since is being fully maintained, with a very attractive volume of new orders on books.

The condition of the old-material market does not improve. Several substantial additions were made to accumulations within the week by reason of the "clean-ups" at mines and at furnace plants, but

the aggregate of forwardings to consumers did not indicate any increase over the week previous. The sales made involved wrought and steel in practically all cases, and the prices received were quite at variance. Dealers' asking prices have not been changed, but all quotations are considered nominal as follows per gross ton f. o. b. cars here, viz.:

Old iron rails, light, \$11.50 to \$12.

Old iron axles, light, \$12.50 to \$13.

Old steel axles, light, \$11 to \$11.50.

No. 1 railroad wrought, \$10.50 to \$11.

No. 2 railroad wrought, \$9.50 to \$10.

No. 1 machinery, \$9 to \$9.50.

No. 1 country, \$7 to \$7.50.

No. 2 country, \$6.50 to \$7.

No. 1 steel, \$8.50 to \$9.

Tram car wheels, \$8 to \$8.50.

Standard car wheels, \$9.50 to \$10.

Light cast and stove plate, \$6 to \$6.50.

No large contracts have been added to order-book requirements at cast-iron water pipe plants since last report, but a very attractive volume of small orders has been placed. Shipments are now being made against the tonnage placed for Spokane, Wash., and Los Angeles, Cal., as well as against tonnage for Minneapolis, Minn.,

and St. Paul, Minn. It is noted that the movement to all of the points just mentioned has been delayed more or less by the continued extremely cold weather. Considerable interest is given the proposal of a local producer to establish sales offices along the Pacific Coast. From the territory referred to a very large volume of business is to come during this year, and it is quite probable that the tonnage will be furnished from Southern plants, owing to the comparatively short time now necessary to effect delivery after forwarding. The advance in freight rates, of which mention has previously been made, to Cuban and South American points will become effective according to recent announcements. It is not definitely known to just what extent Southern producers will be affected by the increase proposed, owing to uncertainty as to rates to be left in effect from Eastern producing points. The tonnage of cast-iron pipe exported from this district through New Orleans, La., and Mobile, Ala., during the past few years has been very attractive, despite the keen competition from the East, which resulted from combination rates through New York city. Water pipe is quoted as follows per net ton f. o. b. cars at Birmingham district foundries, viz.: 4-inch to 6-inch, \$23; 8-inch to 12-inch, \$22; over 12-inch, average \$21, with \$1 per ton extra for gas pipe. These prices are probably shaded for large municipal contracts.

From the returns made so far to the chief mine inspector for Alabama it is believed that the total coal tonnage mined during 1911 will be in excess of 15,000,000 tons. This tonnage, of course, includes both steam and domestic grades and the coal consumed by making coke for furnace consumption. The showing indicates a material increase over the year previous, and as the furnace consumption was unusually low during the period covered, an extension of the territory accessible for commercial purposes has necessarily been effected. At the present time plans are under consideration for a much larger output than even that of 1911, and the percentage of washed coal to be offered will be larger than ever before. The construction of at least three modern washing plants will be commenced within the next 30 days, and plans for other improvements, though not announced, have taken definite form. In this connection particular attention is given to the developments in Walker county, while operations in both Jefferson and Tuscaloosa counties will be extended. The market for steam coal continues very strong, with prices slightly higher than the figures asked at this time one year ago. Quotations on foundry coke are at about the same level as has been obtained for some months past, but the demand is very satisfactory, and the output from all commercial ovens is being moved promptly.

CORPUS CHRISTI'S GROWTH.

Rapid Development There in Past Few Years.

[Special Cor. Manufacturers Record.]

Corpus Christi, Tex., February 15.

Corpus Christi, with a population of 14,000 entering upon the year 1912, has a most encouraging outlook for the future, with its many enterprises now under way and others for which plans have been drawn. This section has made rapid strides from a grazing land into a most prosperous farming country. Six years ago 10,000 acres under cultivation within a radius of 50 miles of Corpus Christi would have been a liberal estimate. Last year upwards of 40,000 acres of new land was plowed up by the farmer for his especial use. With 65 traction engines at work within this area the estimate of new

land to be placed under cultivation during the new year can hardly be placed below 60,000 acres. Nueces county, of which Corpus Christi is the county-seat, is one of the largest counties in the State, and at least 90 per cent. of its area is good agricultural land, so in the not distant future this immediate section promises to be one of the leading agricultural counties in the State.

The United States Government, appreciating its location and the need of more ports on the Gulf of Mexico, has already given the city a 20-foot depth over the bar at Aransas Pass, and is now dredging a 13-foot channel to the wharves of the city. The city is building a \$50,000 municipal wharf and docks to meet the necessary demands of its shippers.

There are under construction two modern hotels, one of which will open within the next two months and the other during the late summer. The climate during the winter, which has always been compared most favorably with that of both California and Florida, has attracted many winter visitors. Buildings now nearing completion or under contract for the immediate future include two hotels to cost \$750,000; business houses, \$100,000; post-office, \$75,000; city hall, \$55,000; residences, \$50,000; municipal wharf, \$50,000; sewerage, \$110,000, and extensions to water mains, \$10,000.

Ginners Organize.

Commercial Club,
Kingsville, Tex., February 10.

Editor Manufacturers Record:

R. G. Flato, manager of the Kingsville Cotton Oil Co., has been elected secretary-treasurer of the Nueces County Association of Ginners. The other officers are G. L. Caldwell of Corpus Christi president and C. C. Bendell of Robstown vice-president. The general purpose of the organization is to bring about a closer co-operation among the ginners, to the end that better methods of preparing cotton may be employed and better machinery used. The statement has been made that 4000 acres more land will be under cultivation in Nueces county this year than were cultivated last year.

B. F. JOHNSON, Secretary.

Against a Parcels Post.

At the second annual meeting at Nashville Tenn., next week of the Southern Merchants' Association a protest will be made against the establishment of a parcels post system on the ground that such a system will tend to destroy business of the small retailer to disadvantage the business of the jobber and to establish a subsidy in favor of the mail order house in a few large cities. Mr. L. Jonas of Nashville is the president of the association.

For 60 Miles of Roads.

The Good Roads Commissioners of Hazlehurst beat, Hazlehurst, Miss., have awarded contract for the construction of 60 miles of roads, the contractors being Messrs. McTighe, Huyhey & McTighe of Memphis. It is proposed to complete this work in five months.

The Board of Trade of Asheville, N. C., N. Buckner, secretary, is circulating an attractive pamphlet descriptive of the city and its surroundings, and dwelling especially upon the provisions for the maintenance of health there.

The Chamber of Commerce of Spartanburg, S. C., John Wood, secretary, is circulating a folder in which a number of brief sentences telling of the city's opportunities spell out the acoustic "Spartanburg, the City of Success."

GOOD ROADS

WEEK'S HIGHWAY RECORD.

Progress in Southern Road and Street Improvement.

[Full details of highway undertakings are given in the Construction Department.]

Bonds Voted.

Petersburg, Va.—Board of Aldermen authorized \$50,000 bond issue for street improvements.

Portsmouth, Va.—Common Council authorized \$100,000 bond issue for street paving.

Vicksburg, Miss.—City voted \$100,000 bond issue for street improvements.

Bonds to Be Voted.

Fayetteville, N. C.—Cumberland county will vote May 6 on \$200,000 bond issue for road improvements.

Gibson, Ga.—Glascok county will vote on \$33,000 bond issue for road construction.

Moulton, Ala.—Lawrence county will vote March 18 on bond issue for road construction.

Palo Pinto, Tex.—Precinct No. 1 of Palo Pinto county will vote on \$100,000 bond issue for road construction.

San Benito, Tex.—City will vote March 9 on \$48,000 bond issue for street improvements.

Taylor, Tex.—City will vote March 19 on \$25,000 bond issue to pay city's share of cost of paving Main and other business streets.

Whigham, Ga.—City will vote on \$12,000 bond issue for improving streets, etc.

Contracts Awarded.

Galveston, Tex.—Galveston County Commissioners awarded contract at \$27,500 to grade, shell, bulkhead and otherwise improve Avenue 8 road.

Graham, Va.—Tazewell County Supervisors awarded contract to construct and improve Graham streets and roads.

Helena, Ark.—District No. 6 awarded contract for construction of 20,000 square yards brick paving; cost \$60,000.

Memphis, Tenn.—Colonial Trust Co. awarded contracts aggregating \$40,000 for laying sidewalks and constructing gutters in subdivision.

Orangeburg, S. C.—City awarded contract at \$15,555.85 for vitrified brick paving.

St. Louis, Mo.—City awarded contracts to pave several alleys with vitrified brick.

Waycross, Ga.—City awarded contract to construct 50,000 square yards of cement sidewalks.

Contracts to Be Awarded.

Augusta, Ga.—City will set and lay granite curbing and cement walks at Barrett Plaza in front of union depot.

Baton Rouge, La.—Police Jury of East Baton Rouge parish ordered graveling of Bayou Sara road; cost \$4000.

Cartersville, Mo.—City receives bids until March 7 for constructing combined concrete curb and gutter on both sides of Main street.

Centerville, Tex.—Leon county will construct about 45 miles of sand-clay roads.

Chatom, Ala.—Washington county receives bids until March 4 for grading, draining and surfacing with sand-clay about five miles of State-aid road.

Crowley, La.—City will pave 30,000 yards of Parkerson avenue; cost \$60,000 to \$70,000.

Greenville, Tex.—City will pave 10 blocks of Jordan street with bitulithic.

Houston, Tex.—Harris County Commissioners authorized construction of paved road.

Memphis, Tenn.—City will pave Georgia avenue from Lauderdale to Walnut street.

Pine Bluff, Ark.—City will pave about 17 blocks of pavement.

Portsmouth, Va.—City receives bids until February 28 for improvement of certain streets in Seventh ward.

Red Bay, Ala.—Franklin county and State will construct model road.

Roanoke, Ala.—Randolph county received bids until February 21 for grading, draining and surfacing with sand-clay about five miles of State-aid road.

Rockford, Ala.—Coosa County Commissioners appropriated \$4000 toward construction of road through county.

Selmer, Tenn.—City will construct concrete sidewalks.

Shreveport, La.—Caddo parish will grade, drain and macadamize or gravel 25 miles of road.

Teague, Tex.—City will construct concrete sidewalks and curbs; cost \$15,000.

Wilmington's Progress.

Chamber of Commerce,
Wilmington, N. C., February 17.

Editor Manufacturers Record:

Wilmington's progress along general business lines in the past ten years, as shown by statistics recently compiled, is considered phenomenal in many respects, and the port as usual will maintain her position as fourth in Southern exporting this season.

This immediate section of the country at the present time is attracting more attention for its agricultural possibilities and business opportunities than probably in a decade, and the building progress of Wilmington in the past five years, as shown by statistics, is evidence that the city is forging her way rapidly forward and keeping pace with other cities of the Atlantic seaboard.

Extensive street improvements now under way will verily change the appearance of the business section and is a modern and marked improvement, along with the erection of a number of splendid new business houses at present in course of construction. Among the interesting facts showing Wilmington to be among the leaders of the South in substantial progress are increases between 1900 and 1911 in bank resources from \$4,083,000 to \$14,114,000; in bank deposits from \$3,192,000 to \$9,815,705; in assessed values of property from \$7,000,313 to \$12,322,610, and in exports from \$10,975,511 to \$28,812,543.

In five years, from 1907 to January 1, 1912, there has been erected and occupied a large number of residences and mercantile buildings, the following data showing this record: 1640 residences, valued at over \$2,400,000; 182 mercantile buildings, \$3,000,000; 20 public buildings, \$162,000; 5 schools and churches, \$200,000; factories, over \$750,000, and storage warehouse, \$595,000; a total valuation of new buildings constructed in the last five years of \$7,107,000. H. H. BRANCH, Secretary.

For Southwest Georgia.

Chamber of Commerce,
Albany, Ga., February 15.

Editor Manufacturers Record:

The Southwest Georgia Industrial and Commercial Association was organized at a meeting held here at the initiative of the Albany Chamber of Commerce in Albany Wednesday, J. A. Davis of this city was elected president of the new organization, and E. B. Adams, also of Albany, was elected secretary-treasurer. Vice-presidents for various counties were chosen. The vice-presidents, with the president and secretary-treasurer, constitute an executive board, which will meet in this city March 6 to perfect the organization. E. B. ADAMS, Secretary.

RAILROADS

[A complete record of all new railroad building in the South will be found in the Construction Department.]

BEGIN WORK THIS SPRING.

Promoters of Natchez & Eastern Seem to Have Plans Nearly Completed.

Preparation to build the Natchez & Eastern Railroad are under way, according to a report from Meridian, Miss. It is said that arrangements have been made to float from \$3,500,000 to \$4,000,000 of bonds through J. N. Sechrest & Co. of Buffalo, N. Y., and that Mr. Sechrest and J. L. Hegeman of the same city have conferred with Wm. Cornell, M. P. Finnegan and Martin Seegers at Meridian on the plans.

Mr. Cornell is president of the company, which has filed its charter, and it is proposed to get farmers along the route to do considerable of the grading, each man taking a section near his place. A construction company is to be formed to take general charge of the work.

As heretofore stated, the route is from Meridian to Louin, Gallman and Natchez, and west from the latter, finally to Baton Rouge, La. There will be a branch from Union, Miss., north to Forest. It is contemplated to start work this spring, and it appears that the company is not requesting any local assistance.

FRISCO VIA LAUREL.

Change of Plans to Get Route from Chicago via Paducah to New Orleans.

The Frisco system has made an agreement with the New Orleans & Northeastern Railroad of the Queen & Crescent Route by which it will have trackage over the latter's line, between Laurel, Miss., and New Orleans to its own terminal, in that city. Thus the Frisco will use the New Orleans, Mobile & Chicago, in which it is interested, to Laurel, and from there to New Orleans the Northeastern.

It is rumored that in consequence of this agreement the New Orleans, Mobile & Chicago will not carry out its old plan for building a direct line to New Orleans. When the northward extension is made the Frisco will have a direct route from Chicago to the Crescent City.

RAILROAD WAREHOUSES.

Atlantic Coast Line to Increase Cotton Capacity at Savannah.

The Atlantic Coast Line, according to a report from Savannah, Ga., has acquired the United Hydraulic Cotton Press and will construct seven cotton warehouses with a capacity of 1000 bales each. They will be fireproof and substantial. The press now has warehouse space for 9000 bales, so that when the improvements are completed there will be a capacity of 10,000 bales. The cost of the new work is estimated at \$100,000, and it is stated that the company's engineers have been instructed to prepare plans immediately for the early letting of contracts. A cotton platform extending from the press to the river front is also to be built; it will be covered and will hold 5000 or 6000 bales.

WAYCROSS & WESTERN.

A New Cross Line for the Southern Part of Georgia.

A special dispatch from Atlanta to the MANUFACTURERS RECORD says that the Waycross & Western Railroad Co. has been chartered to build a line from Waycross west to Adel, Ga., 73 miles, connecting there with the Georgia Southern & Florida Railway; capitalization \$350,000; incorporators, Albert H. Sessoms, Alex.

K. Sessoms, John G. Sessoms, E. T. King, George W. Deen and others of Waycross, Georgia.

Northern Central in 1911.

The general income account, embodied in the fifty-seventh annual report of the Northern Central Railway, covering the year ended December 31, 1911, shows that the total operating revenues for the year were \$12,745,866.84, a decrease of \$52,761.47 as compared with 1910. The total operating expenses were \$10,726,344.70, decrease \$55,124.36; net operating revenue \$2,019,522.14, increase \$2,362.89; total net revenue \$2,025,739.95, increase \$1716.33; operating income after payment of taxes \$1,607,177.26, increase \$24,039.41; net operating income after payment of rentals to roads operated on basis of net revenue \$1,512,061.83, increase \$25,828.88; gross income \$2,894,112.96, decrease \$27,365.49; net income after payment of fixed charges \$1,840,874.36, decrease \$18,251.33. Out of the net income there were paid cash dividends aggregating 8 per cent., leaving \$293,474.36 to be transferred to the reserve for additions and betterments. Balance to credit of profit and loss, \$9,637,369.33. The company operates 473 1/4 miles of lines, which is an increase of 4 1/2 miles during the year. Its equipment consists of 236 locomotives, 174 passenger cars, 9335 freight cars and 381 service cars.

President James McCrea also says that the construction, equipment and real estate expenditures for the year totaled \$2,049,714.73, the principal items being \$826,795.42 for the Baltimore Union Station, \$24,689.96 for the Orangeville engine-house and machine shops (this being a portion of the cost), \$82,252.08 for changes in the Mt. Vernon yard, \$27,160.66 for Canton Elevator No. 3 at Baltimore, deepening and widening docks, basin and channel, \$544,818.31 for the Northumberland classification yard, this being a portion of the cost, and \$67,171.81 for new locomotives. The improvements at the Mt. Vernon yard will probably be completed this year. The other work mentioned is all practically finished.

The total assets of the company are \$45,434,091.49, increase \$884,587.30.

New Equipment, Rails, Etc.

The Chesapeake & Ohio Railway has authorized the purchase of 50 locomotives, which will consist of 25 Mallet compound and 25 Mikado type. They will be built by the American Locomotive Co. at its Richmond plant.

The Pennsylvania Railroad is to build 42 locomotives at its Altoona shops.

The King Bridge Co., Cleveland, O., has a contract to furnish 1200 tons of bridge steel for the Pennsylvania lines West.

The Virginian Railway, says a market report, has ordered 500 tons of rails from the Bethlehem (Pa.) Steel Co.

The International & Great Northern Railroad is reported in the market for 15,000 tons of rails.

The Norfolk & Western Railway, says a report, will build at its own shops 500 more hopper cars. The company is also reported to have placed contract for 12,000 tons of rails.

The Mobile & Ohio Railroad has ordered 200 steel underframe ventilated box cars from the Mt. Vernon (Ill.) Car Manufacturing Co.

The Birmingham & Northwestern Railway is reported to have ordered 50 box cars from the Central Locomotive and Car Works, Chicago, and the Middle Tennessee Railroad has bought two passenger cars from the same company.

The Kinder & Northwestern Railroad has ordered a 38-ton locomotive from the

Clover Machine Works, Marietta, Ga., and eight cars from the American Car & Foundry Co., St. Louis.

The Savannah & Southern Railroad, says a market report, has ordered from the Central Locomotive and Car Works 50 flat cars and 15 box cars.

The Rock Island Lines are reported getting bids on six steel dining-cars and two gasoline electric motor cars.

"Cotton Belt's" Improvements.

F. H. Britton, vice-president and general manager of the St. Louis Southwestern Railway (Cotton Belt Route), says that the terminal construction at St. Louis, where the headquarters of the company are situated, includes the erection of a five-story freighthouse 750 feet long, with house and team tracks sufficient to hold approximately 240 cars. Construction is in progress, and will be completed June 1.

This work is part of the construction proposed with part of the proceeds of the \$7,500,000 of new bonds just sold in New York, as reported in last week's issue of the MANUFACTURERS RECORD. Work proposed at Fort Worth, Tex.; Gray's Point, Mo., etc., has not been started.

The work at St. Louis consists in the development of three city blocks between Main and Lewis streets, bounded north by Florida street and south by Dickson street. The depot building is of steel and reinforced concrete. Tracks will be laid with 75-pound steel rails, driveways paved and all the work will be done in accordance with modern standards.

It is not possible at present to give details of construction for other cities, the company's plans not being fully developed. It does, however, contemplate the erection of a freighthouse and team tracks at Fort Worth on property recently acquired, and it also has in mind the enlargement or construction of additional terminals at several other cities to be announced later.

B. & O. Statement.

The Baltimore & Ohio Railroad Co.'s statement of earnings and expenses (exclusive of outside operations) for the month of January, 1912, and for the seven months of the fiscal year follow:

For January—Operating revenue, 1912, \$6,570,122; 1911, \$6,413,316; increase, \$156,806; total operating expenses, 1912, \$5,271,894; 1911, \$5,276,035; decrease, \$4141; net operating revenue, 1912, \$1,298,228; 1911, \$1,137,281; increase, \$160,947.

For seven months—Operating revenue, 1912, \$53,492,506; 1911, \$53,409,693; increase, \$82,813; total operating expenses, 1912, \$37,330,684; 1911, \$38,906,975; decrease, \$1,576,291; net operating revenue, 1912, \$16,161,822; 1911, \$14,502,718; increase, \$1,659,104.

The foregoing does not include "outside operations," which, as estimated, will show a deficit in net in January of \$65,000 and for the seven month of \$390,116, compared with deficits of \$64,676 and \$79,389, respectively, for the same periods last year.

Stone & Webster Manual.

Stone & Webster, 147 Milk street, Boston, have issued their "Electric Railway and Lighting Properties" Manual for 1912. It gives brief descriptions of the various companies under the management of the Stone & Webster organization, together with statements of capitalization, earnings and expenses for 1911, besides particulars regarding the securities. A combined statement of the companies, which are in various parts of the country North, South, East and West, shows total capitalization of \$161,532,600; gross earnings for 1911, \$22,848,480; operating ex-

penses, \$12,542,261; net earnings, \$10,306,219; balance (after payment of taxes, interest charges and dividends, also adding income from other sources), \$2,033,470. The book is handsomely bound in leather and lettered in gold.

Increasing Terminal Facilities.

A report from Savannah says that the Seaboard Air Line will spend \$100,000 there to increase terminal facilities on Hutchinson Island and enlarge the cotton capacity by 20,000 bales. J. Randolph Anderson, counsel for the road, is quoted as confirming the report. Plans for the work are being prepared.

The Atlantic Coast Line is also said to have decided to make improvements, and its engineers are preparing a report for the directors. The Central of Georgia Railway is likewise working on plans for providing additional facilities for storing cotton.

These proposed improvements are the result of the heavy movement of cotton through the port of Savannah last season, and it is intended to have them completed by next autumn.

A Mountain Line.

The Yadkin River Railroad Co. has just been chartered in North Carolina to build a line from Boone, the seat of Watauga county, eastward into Wilkes county and to North Wilkesboro, 45 miles. Capital is \$225,000. Boone is up in the mountains, and although North Wilkesboro in a direct line is little more than 25 miles eastward, the railroad will probably have to be nearly twice that length on account of the nature of the country to be traversed. It will develop timber lands and will also be a common carrier. The directors are C. H. Cowles of Wilkesboro, N. C.; T. B. Finley of North Wilkesboro, W. J. and G. M. Grandin of Tidioute, Pa., and J. T. Henderson and H. C. London of Lenoir, N. C.

Improvements at Waco.

A report from Dallas, where the Texas headquarters of the company are located, quotes A. D. Bethard, vice-president and general manager of the Missouri, Kansas & Texas Railway, as saying that it is about to begin construction of terminal improvements in the eastern part of Waco, Tex., expending more than \$300,000. Shops, a roundhouse, a turntable and other buildings will be erected and equipped. One of the improvements will be a plant to eliminate lime from the water that is used for locomotives.

Mr. Bethard wires the MANUFACTURERS RECORD that the plans are not entirely perfected.

Chicago, Paducah & Thebes.

According to a dispatch from Shelbyville, Ill., the Chicago, Paducah & Thebes Railway Co., recently chartered in that State, will build a line from Streator to Brockport, Ill., with a branch to Thebes, Ill., this being presumably a plan to be executed in connection with the construction of the proposed new bridge over the Ohio River at some point between Paducah, Ky., and Metropolis, Ill. Clarence B. Long, Arthur M. Beckwith, Walter E. Beckwith, E. W. Heckenroger and Wm. R. Brown, all of East St. Louis, are the directors.

A Texas Interurban Plan.

The Greenville & Whitewright Northern Traction Co. has been chartered in Texas, with headquarters at Whitewright, to build a line from Greenville to Merit, Blue Ridge, Westminster and Whitewright, about 40 miles. Capital is \$210,000, and the incorporators are A. R. Nicholson, J. W. Castleberry, H. A. Barsun, A. W.

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Delee, J. E. Morris and W. H. James of Greenville, and S. M. Dickens of Merit, Tex. Notice of dissolution of the Mineral Heights Traction Co. of Greenville, in which the same people are interested, was also filed.

Coal Tipple at Gulfport.

The Gulf & Ship Island Railroad Co. is building at Gulfport, Miss., for coaling vessels a 100-ton coal tipple. The foundation is about completed and the Fairbanks-Morse Company of Chicago will begin the erection of the tipple itself within a few days. In connection with the device there will be a large storage yard, where coal will be unloaded by means of a crane and a system of scraper buckets to convey coal from storage to the track hopper and thence to the tipple. The work is being done under the direction and supervision of W. H. Gardner, Jr., chief engineer.

Reballast with Gravel.

E. F. Mitchell, chief engineer of the Missouri Pacific Railway, St. Louis, says that the improvements to be made between Memphis, Tenn., and Bald Knob, Ark., consist of ballasting the main line between the latter place and Wynne, Ark., 45 miles, which will be done by the company's forces with gravel from pits on the line. The report that \$700,000 would be spent is an error; the work will not cost anything like that sum.

Dallas and Waxahachie.

Construction of the interurban electric railway by the Stone & Webster interests between Dallas and Waxahachie, Tex., is reported nearing completion, and track-laying machinery which has been used on the Galveston line is being transferred to Dallas to lay the steel for the new road.

TEXTILES

[A complete record of new textile enterprises in the South will be found in the Construction Department.]

The Georgia Cotton Mills.

The Georgia Cotton Mills of Griffin has organized with the following directors: Clyde L. Kink (chairman), Bolling H. Jones, J. H. Nunnally, Sam D. Carter and D. W. Manley of Atlanta, Roswell H. Drake and H. H. Bass of Griffin, W. J. H. Pitts of Waverly Hall and A. Minis of Savannah. This company will operate the plants heretofore known as the Central, Spalding and Boyd-Mangham mills, and it plans to expend \$25,000 for improvements.

Cotton Rope.

J. D. Wyrick of Bearden, Tenn., writes to the MANUFACTURERS RECORD that he wants to correspond with manufacturers of cotton rope suitable for making mops.

Textile Notes.

The Virginia Hosiery Mills, Virgilina, Va., has increased capital stock to \$12,000 and ordered additional machinery.

J. H. White, president of the Travora Manufacturing Co., Graham, N. C., is not planning to build a cotton mill. The report mentioned last week was an error.

The Travora Manufacturing Co., Graham, N. C., will build 64x60-foot napper-room to be equipped with nappers now in mill.

The Kilbourn Knitting Machine Co., Martinsburg, W. Va., will erect an additional building, but has not as yet approved plans. It now operates 1000 knitting machines, dyeing and finishing equipment, etc.; executive offices at New Brunswick, N. J.

MINING

Improvements to Cost \$225,000.

Frank Nelson, Jr., president of the Bryan Coal Corporation, Birmingham, writes the MANUFACTURERS RECORD confirming a report that his company will expend \$225,000 for improvement of the Bryan coal lands to be begun within a few weeks. The improvements will include the erection of a washer on the Red Star properties, increasing the Red Star output from 400 to 1000 tons of coal daily, making openings adjoining the Red Star mine, installing new machinery, etc. Details of the new construction and equipment have not been determined, but will be given immediate attention, so that the improvements may be promptly undertaken and completed.

Purchased Kentucky Mining Property

W. T. Drury of Morganfield, Ky., wires the MANUFACTURERS RECORD: "Mine at Waverly, formerly operated by Drury Coal Co., has been sold to Birmingham capitalists incorporated as the Alabama Coal & Coke Co. of Waverly, Ky. The purchasers will immediately put in new boilers, pumps and coal-cutting machinery, build additional houses and remodel and repair the tipple."

FOREIGN NEEDS

Machinery and equipment wanted abroad are mentioned in many letters received by the MANUFACTURERS RECORD, which is so widely read in foreign countries that we are in constant receipt of many letters from all parts of the world. For the benefit of publish the following extracts from recent our subscribers seeking foreign trade we letters:

Canning and Pickle Equipment.

P. D. de Pool, P. O. Box 297, Havana, Cuba, writes to the MANUFACTURERS RECORD:

"Interested in the canning of tomatoes and peppers and the making of pickles, I wish to get such information as may be useful to the business and beg you to kindly let my wants be known through your valuable paper. Catalogues of canning machinery, data about manner of making and canning tomatoes principally will be welcome."

Bakers' Machinery.

A. Naessens, Rue du Cheval Noir 27, Brussels, Belgium, writes to the MANUFACTURERS RECORD:

"I am reading the MANUFACTURERS RECORD in the Brussels Museum. I wish to know the addresses of makers of bakers' machinery, and particularly of specialties of this trade; also novelties of kneading, mixing, dough cutting, etc."

Operating Its \$200,000 Mill.

The Whiting Lumber Co. of Philadelphia is now operating its \$200,000 mill recently completed at Robbinsville, N. C. This plant comprises buildings of brick, steel and wood construction, equipped with machinery for a two-hand mill having a capacity of 75,000 feet of lumber every 10 hours and employing 300 men.

To Drain 75,000 Acres.

The Western Drainage Corporation of Atlanta, Ga., has been incorporated by Frederick Fleming and J. P. McKinney of Dallas, Tex. It has acquired 75,000 acres of land in Ware county, Georgia, and will drain the property by agricultural development. The company has an authorized capital stock of \$2,000,000, and it is stated that \$200,000 has been paid in.

MECHANICAL

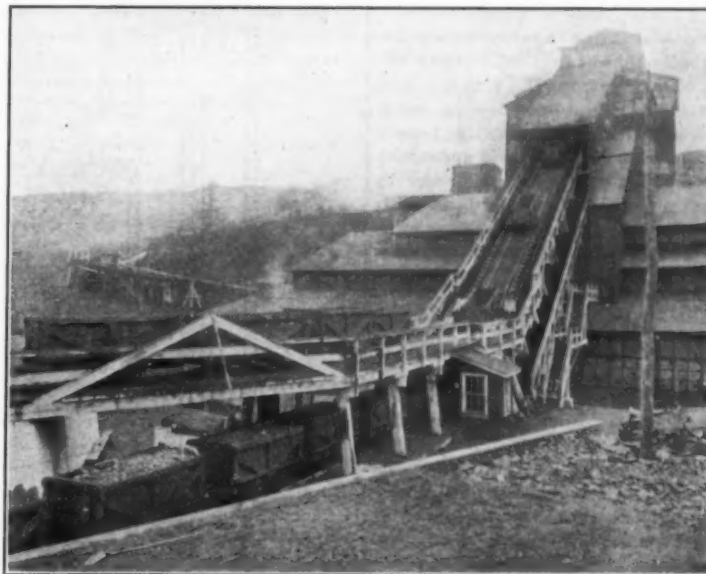
The Greene Self-Dumping Car Haul.

The C. O. Bartlett & Snow Company, Cleveland, O., has recently completed the installation of the Greene self-dumping car-haul system at the Burnside colliery of the Philadelphia & Reading Coal & Iron Co., Shamokin, Pa. This installation replaces the old system, and is the first one to be used in the anthracite regions. The accompanying illustration gives a good view of the new system, and the following explanation of its operation will give an idea of the efficiency and economy to be obtained in its use.

The Burnside breaker receives coal from three openings, so that speedy handling of the cars is required at all times. The new self-dumping car accomplishes this, and more. Variable-speed motors furnish the power to run the main haul from 44 feet to 88 feet per minute, hence a shut-down in the breaker can be quickly compensated by speeding up the haul and reducing the accumulation of loaded cars. As will be seen by the illustration, the equipment is simple, notwithstanding the wonderful results that it will accomplish. It consists of an endless chain revolving

haul is not a necessity if it is preferred to handle the cars by hand power, but it effects economy in the number of men required. The operation of dumping the car and placing it empty on the upper track by means of the swinging lift is automatic, and only one man is required at that end of the system to see that everything works smoothly.

The empty car, on arriving at the foot of the incline, is freed from the system and turned on to the ground track by means of a balanced track and a corresponding cam release device. This release is effected by means of the cross-arm wheels, which pass under the upper end of the balanced track as the empty car is stopped. The cross-arm and cross-arm wheels, being free and operating on a separate track, slip beneath the balanced track and trip it, so that the car passes over the balanced track. The weight of the car as it passes over to the ground track throws the balanced track back into position for the next car. These operations are all automatic, and the simplicity is apparent when seen in operation. The system ordinarily handles from 120 to 130 four-ton cars per hour. Electrically-operated Bristol recording dials make a complete record of the operations of the sys-



GREENE SELF-DUMPING CAR HAUL AT BURNSIDE COLLIERY.

about a sprocketed wheel at either end of two tracks placed one above the other, the chain having protruding cross bars that engage a loaded car behind its rear wheels, and after having slightly elevated it to accommodate it to the 30 per cent. grade the car is run up to the breaker. As the load of about four tons is being automatically dumped a swinging lift elevates the rapidly emptied car to the upper track, by which it returns to the tracks leading back to the mines. Only two men are required, which results in a great saving of expense. Besides the swinging car lift that starts the empty cars back down the track, two other important devices complete the auxiliary parts of the installation. These are the feeder haul, which starts the loaded cars on the main track, and the empty car release, both of which operate automatically. The feeder haul consists of an endless chain on two sprocketed wheels geared to the larger sprockets that operate the main haul. The chain has two swinging catches or dogs that feed the cars into the main haul at proper intervals. As the train of loaded cars approaches the feeder haul the head car is caught by this dog and passed forward to a position where a man is stationed to pull out the coupling pin. A cross bar on the main haul takes the cars on up the incline. This feeder

tem, and one of the valuable features of the invention is this reliability in recording its own work and affording the means of detecting and locating the cause of any shortcomings.

About 850 cars of coal are sent from the three mine openings each day and handled by the breaker in 8½ hours, not allowing for stops. Electricity is the motive power employed, and it is found that it adds efficiency by reason of the time saved in starting and stopping. The Greene self-dumping car haul has proven that it fits into this coal-handling system admirably, and reports made show that it is giving entire satisfaction. The simplicity, reliability, positive action and safety features are made apparent to those interested in the coal industry on observing it in operation at this well-equipped plant.

Fairbanks-Morse Marine Motors.

Reliability is one of the principal requirements of motors used in power boats, since upon this feature the safety of such boats and the people on board depends. The reliability of Fairbanks-Morse engines made by Fairbanks, Morse & Co., Chicago, for whatever purpose used is well illustrated by the example of the seven-horsepower type "E" marine engine installed in the 23-foot launch "Gladys," which has

just completed a trip of 1200 miles. The "Gladys" is owned by P. A. Powers of New Smyrna, Fla., and is shown in the accompanying illustration navigating the inland waters of Florida. In the trip referred to the "Gladys" towed an 80-foot lighter loaded with gasoline drums for a distance of 200 miles, making the trip in much less time than other boats on the same run. Mr. Power states that he is more than pleased with the engine, and that many of his friends are arranging to adopt the Fairbanks-Morse engine in their power boats.

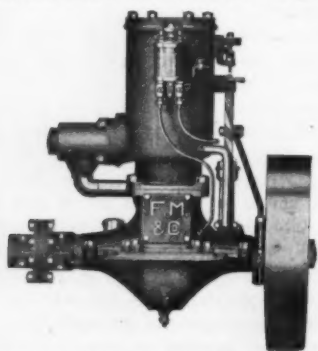
Another notable trip made by a small



"GLADYS" WITH 7 H. P. FAIRBANKS-MORSE MOTOR.

power boat using a seven-horse-power Fairbanks-Morse two-cylinder engine was that of the "Harpoon II," a 23-foot open boat fitted with canvas housing, which made a 9000-mile trip with three persons from Jacksonville to Montreal and return. The dependence placed in this motor by these travelers is indicated by the fact that a considerable part of the trip was made on ocean stretches between the entrances to the inland waters. The seven-horse-power type "E" two-cylinder engine is light weight, of high speed, and is especially adapted for pleasure boats up to about 20 feet in length.

A new and larger type "K" engine has been built, consisting of one cylinder, 5½-inch bore and 6-inch stroke, developing 7½ horse-power, or with two cylinders developing 15 horse-power at 550 revolutions per minute. The accompanying illustration shows the single-cylinder 7½-horse-power motor. This engine is fitted with "make-and-break" ignition, plunger pumps, lubrication by gravity system or through carbureter, and has a manifold combining intake and exhaust hot-air adjustments to carbureter. The cylinder head gasket does not come in contact with the circulation water. The bearings are



FAIRBANKS-MORSE MARINE MOTOR.

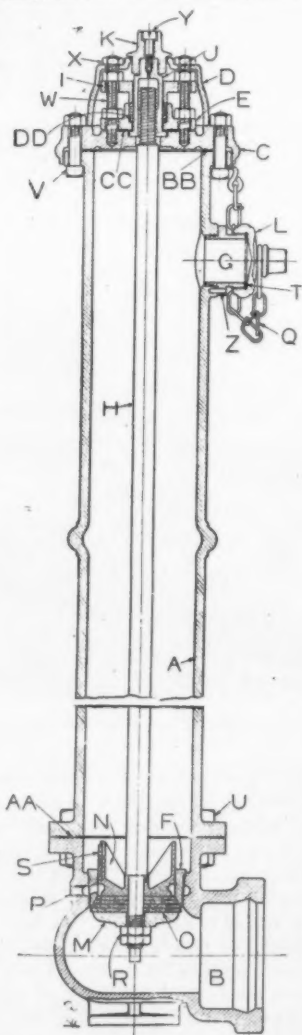
of bronze, are unusually large, and are removable and interchangeable. Base explosions in this engine are prevented by a new device. The engine is liberally designed, and will operate successfully on low-grade fuels, and the designer claims great economy in fuel in its use.

A booklet showing the size and types of boats in which these engines have been used has been published, and will be mailed upon application. The company's 1912

catalogue will be mailed to anyone addressing any office of Fairbanks, Morse & Co. This company will have an extensive exhibit of its machinery at the Boston and New York motor boat shows, including these engines shown in a sectional form, operated by electric motors, so that every working part can be examined. The New York Motor Boat Show will be held in Madison Square Garden February 17-24.

"Newtype" Compression Hydrant.

A hydrant has been developed by the Kennedy Valve & Manufacturing Co., Elmira, N. Y., which embodies in its construction several advantageous features which are shown in the accompanying illustration. This is known as the "Newtype" compression hydrant, and has been placed on the market as one of the "Newtype" line in connection with the "Newtype" water gate valve, which is reported to have met with marked success since it was placed on the market over a year ago. As will be seen by referring to the illustration, the working parts of this hydrant, including the seat ring, are easily removable



"NEWTYP" COMPRESSION HYDRANT.

after the hydrant is connected to the underground pipe, and without disturbing any connections, at a saving of expense and time.

An efficient drip valve at the lowest part of the hydrant drains the standpipe, thus preventing freezing and the expense of supplying a frost case.

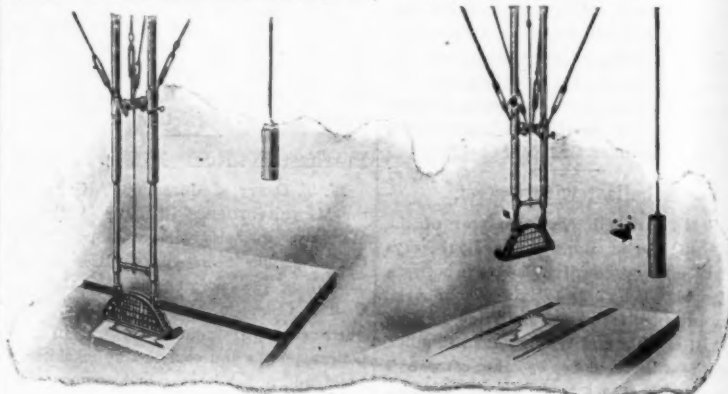
In order that the nozzles may be easily removed, as is sometimes necessary to change nozzles of one standard to another, they are screwed in and secured by pins.

The hydrants are of the compression type, and in closing, the inlet valve operates in the same direction as the pressure from the main, and when closed this pressure aids the action of the stem in keeping the valve tight. In case of accident of

any kind to the upper part of the hydrant, resulting in the relaxing of the tension on the stem of the valve, the pressure from the main will retain the valve in its closed position without any special mechanism, thus preventing inconvenience or damage from loss of water, flooded streets, etc. The new catalogue illustrating and describing these hydrants will be sent on request to the company or any of its agencies.

Huther Saws and Equipments.

The safety appliances manufactured by the Huther Bros. Saw Manufacturing Co.,

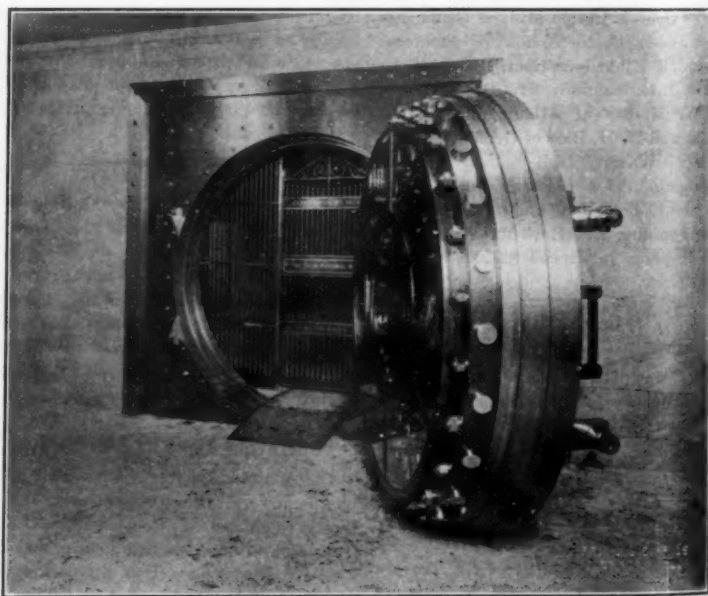


HUTHER CEILING SAW GUARD.

Rochester, N. Y., to be used in connection with circular saws are made to be attached either to ceiling from which the guard is lowered to the saw when necessary or in a form to be attached to the table near the saw over which the hood is lowered when required. The No. 4 ceiling saw guard is shown in the accompanying illustration. This guard is adapted for sliding or tilting tables. It is strong, and designed to obtain firmness and rigidity; at the same time it operates automatically for different thicknesses of material. A slight movement of the counterweight shown in the illustration raises or lowers the hood and a turn on the thumb screw secures the sliding frame in place. Being attached to the ceiling directly over the

A Great Bank Vault.

The financial development of the South is illustrated in the construction for the Third National Bank of Atlanta of what is said to be the largest bank vault in the South. It was built at a cost of \$60,000 by the Mosler Safe Co. of Hamilton, O., under the supervision of C. W. Freeman of Atlanta, engineer in charge of construction and general Southern sales manager. The safe door, shown in the accompanying illustration, weighs about 60,000 pounds. It is eight feet in diameter, 22 inches thick. It locks with 24 three-and-a-half-inch bolts. The door and the balance of the vault weigh in the aggregate about 400,000 pounds. The con-



A GREAT BANK VAULT.

saw and of exceptional strength, this guard can be used for saws up to 24 inches in diameter. There are no loose or shaky parts to get out of order.

The guards, which are made to attach to the right-hand side of the saw table, are similar in form to the one illustrated, but the shaft is bracketed to the table and a hood is raised or lowered or the entire guard is swung aside for changing saws by simply unclamping the shaft and ma-

nipulating the guard by hand. The hood can be adjusted close to the lumber, insuring protection to the operator without hiding the saw or the work from his view. One turn on the clamping handle releases the shaft.

The various circular saws, patent dado heads, milling saws, patent boxboard matcher cutters, lock corner cutters, concave saws, band and rip saws and resaws, saw filing machinery and special grooving saws are illustrated and described in catalogue No. 32, in which the safety guards are also shown.

In the past 20 years Tennessee has expended more than \$7,000,000 upon road improvement.

Construction Department

TO OUR READERS!

In order to follow up properly the Construction Department items, please bear in mind the following statements:

EXPLANATORY

The MANUFACTURERS RECORD seeks to verify the items reported in its Construction Department by full investigation. It is often impossible to do this before the item must be printed or else lose its value as news, and in some items it is found advisable to make statements as "it is reported" or "rumored," and not as positive information. If our readers will note these points they will see the necessity of the discrimination. We are always glad to have our attention called to errors that may occur.

HOW TO ADDRESS

The name of one or more incorporators of a newly incorporated enterprise should always be shown on letter addressed to the official headquarters or to the town of the parties sought, as may be shown in the item. Sometimes a communication merely addressed to the corporate or official name of a newly established company or enterprise cannot be delivered by the postmaster. By following these general directions the postoffice will be enabled to deliver your mail promptly, although it is inevitable that some failure by the postal authorities to deliver mail to new concerns will occur.

WRITE PERSONAL LETTERS

In communicating with individuals and firms reported in these columns a letter written specifically about the matter reported will receive better and quicker attention than a circular. In most instances a return postal card or addressed and stamped envelope should be enclosed with letter.

In correspondence relating to information published in this department, it will be of advantage to all concerned if the Manufacturers Record is mentioned.

The Daily Bulletin of the Manufacturers Record is published every business day in order to give the earliest possible news about new industrial, commercial, building, railroad and financial enterprises organized in the South and Southwest. It is invaluable to manufacturers, contractors, engineers and all others who want to get in touch at the earliest moment with new undertakings, or the enlargement of established enterprises. The subscription price is \$25 per year. On all advertising contracts in the Manufacturers Record for three months or longer a subscription to the Daily Bulletin is included for the contract period.

BRIDGES, CULVERTS, VIADUCTS

Ala., Florence.—Lauderdale county will construct steel bridge over Anderson Creek at Goodsville Rd.; 75 feet long and approaches; cost \$250. Address County Commissioners.

Ark., Osceola.—Drainage District No. 9 awarded contract to Stiles Steel Bridge & Construction Co. of St. Louis, Mo., at \$14,411 to construct 22 steel bridges; Morgan Engineering Co., 608 Goodwyn Institute, Memphis, Tenn., engineer in charge. (Call for bids lately noted.)

Fla., Jacksonville.—Duval county will construct concrete bridge on Pensacola Rd. in Cracker Swamp; also two wooden bridges on Fernandina Rd. at Inconstant River; former 510 feet long, 16 feet wide; concrete floor; steel spans; cost \$18,000; will open bids March 29; Gall L. Barnard, County Engineer. (See "Machinery Wanted.")

Md., Annapolis.—P. M. Womble, president Severn River Association; O. E. Weller, chairman State Roads Commission, and others have been appointed committee to consider erection of bridge over Severn River; proposed that Government, State, Anne Arundel county, Maryland Electric Railway and property owners co-operate on project.

Mo., Kansas City.—Board of Public Works adopted plans for bridge over Brush Creek at Main St.; reinforced concrete; three flat arch spans; concrete piers; width 40 feet, length 136 feet, roadway 36 feet wide, with 7-foot sidewalk on each side; estimated cost,

\$15,000; board will invite bids and probably award contract March 5.

S. C., Columbia.—Southern Railway, B. Herman, chief engineer, Washington, D. C., will, it is reported, construct steel bridge over crossing at foot of Elmwood Ave.

Tenn., Memphis.—Illinois Central Railroad, A. S. Baldwin, chief engineer, Chicago, Ill., will construct viaduct from Butler Ave. to point south of proposed depot; viaducts are also proposed in all parts of yard to be used by passenger trains.

Tenn., Memphis.—Illinois Central Railroad, A. S. Baldwin, chief engineer, Chicago, Ill., is preparing plans for viaduct over Beale Ave. to Pontotoc Ave.

Tenn., Memphis.—City contemplates construction of 600-foot viaduct across tracks of Louisville & Nashville Railroad estimated to cost \$75,000; this is in connection with plan to extend Winchester St. across tracks and connect with north parkway at Manassas St., for which Heskell Weatherford, City Engineer, has made preliminary survey; total estimated cost, \$100,000.

Tex., Franklin.—Robertson county defeated \$25,000 bond issue for bridge purposes. Address County Commissioners. (Recently mentioned.)

Va., Doswell.—Richmond, Washington & Chesapeake Railway Co., Charles W. Luck, secretary-treasurer, Tappahannock, Va., will construct bridges across Rappahannock River and over Mattaponi River; former will consist of 90-foot draw span, four 60-foot girder spans and 5400-foot pile and frame trestle; latter 60-foot girder and 294-foot pile and frame trestle; other bridges will include 4393 feet of pile and frame trestles.

W. Va., Charleston.—Norfolk & Western Railway, C. S. Churchill, chief engineer, Roanoke, Va., petitioned Legislature for authority to construct number of bridges over Tug Fork of Big Sandy River.

CANNING AND PACKING PLANTS

Ark., Nashville.—W. J. Peppard states organization of company to establish cannery is contemplated; daily capacity, 30,000; seeking competent operator. (See "Machinery Wanted.")

Ark., Little Rock.—Ben Weil & Sons, Evansville, Ind., propose organizing \$200,000 corporation to build meat packing plant.

Fla., Ruskin.—Ruskin Co-operative Mercantile Co. contemplates establishment of vegetable cannery, to be operated in connection with store. (See "Machinery Wanted.")

Ky., Louisville.—New Louisville Packing Co. contemplates increasing capital stock to finance improvements to plant.

La., Monroe.—Swayze Packing Co., M. D. Swayze, proprietor, will rebuild packing plant recently reported burned at loss of \$60,000.

Virginia.—Philip Hamilton, 63 Jefferson St., Paterson, N. J., states he has withdrawn proposition to establish preserving and canning factories in South Carolina, and contemplates plants in Virginia. (Recently noted under S. C., Columbia.)

Va., Richmond.—Jefferson Pickle Corporation incorporated with \$25,000 capital stock; C. T. Ammons, president; H. W. Cottrell, vice-president; R. Allen Ammons, secretary-treasurer.

Va., Sunnybank.—Northumberland-Potomac Packing Corporation organized to erect plant for packing tomatoes, herring and herring roe; R. L. Williams, president; Luther Rice, vice-president; W. H. Blackwell, secretary-treasurer, all of Reedville, Va.

CLAYWORKING PLANTS

Ala., Leeds.—Clay Products.—Leeds Clay Products Co. organized to develop shale deposits on land owned by E. L. Patton and to manufacture brick.

Ga., Atlanta.—Pottery.—Summit China Co. of Akron, O., is considering building pottery near Atlanta; nothing definite yet.

COAL MINES AND COKE OVENS

Ark., Hartford.—Looper Co-operative Coal Co. incorporated with \$10,000 capital stock by J. D. Bennight, W. T. Hall, L. B. Claborn and Dick Garrett of Hartford, and O. T. Looper and K. W. Trigg, Midland, Ark.

Tex., Laredo.—Santo Tomas Coal Co. incorporated with \$140,000 capital stock by Albert Urbahn, M. T. Cogley and G. W. Derby.

W. Va., Fairmont.—Woodsfield Coal Co. incorporated with \$25,000 capital stock by O. T. Looper and J. W. Trigg of Midland, Ark.; J. D. Bennight, W. T. Hall, L. B. Claborn and Dick Garrett of Hartford, Ark.

W. Va., War.—John's Branch Coal Co. incorporated with \$10,000 capital stock by K. R. Harmon, George P. Hall, S. F. Harman and W. F. Harman of North Tazewell, Va., and R. M. Meyer of Bramwell, W. Va.

CONCRETE AND CEMENT PLANTS

Okla., Oklahoma City.—Concrete Tile.—American Concrete Tile Co. (recently noted incorporated with \$5000 capital stock) elected F. G. Gorman of Okemah, Okla., president; C. R. Hoffer, secretary; D. K. Pope, vice-president, treasurer and manager.

Tex., Lubbock.—Cement and Supplies.—J. P. Hesser Cement & Supply Co. incorporated with \$5000 capital stock by J. M. Mullen, Walter Willmering, J. P. Hesser and H. C. Mercer.

COTTON COMPRESSES AND GINS

Ala., Ashville.—R. J. Dodd and Marvin Sheffield purchased cotton gin and mill for \$4500; will install additional machinery; operate as Ashville Gin & Milling Co.

Fla., Gainesville.—Mrs. Lois Tucker will open bids May 1 to rebuild cotton gin; fireproof construction; machinery will include 40-horse-power motor, 5 gins, 2 presses and suction pipe. (Recently reported burned.)

Ga., Newborn.—Company will be organized with \$10,000 capital stock by C. M. Gay, F. R. Porter, J. P. Childs and others to erect double-system ginney.

Tex., Hutto.—Tom Hyslop will establish cotton gin.

DRAINAGE AND IRRIGATION

Miss., Belzoni.—Belzoni Drainage District of Washington county is arranging for construction of proposed drainage system to reclaim 90,153 acres; H. A. Klipp, drainage engineer, estimates cost at \$241,053.

Miss., Sunflower County.—Drainage Commissioners, J. R. Hervey, president, will let contracts March 5 for proposed 22 miles open ditches; about 900,000 cubic yards excavation. Address D. M. Quinn, Indianola, Miss. (See "Machinery Wanted.")

Tex., Fort Stockton.—John Brooks of Boston, Mass., wires Manufacturers Record: "My engineers are preparing plans and specifications for irrigation project near Fort Stockton; when plans are completed shall furnish you detailed account." Mr. Brooks lately reported as planning to expend \$300,000 to irrigate 28,000 acres of land; he can be addressed at Fort Stockton.

Tex., Mercedes.—American Rio Grande Land & Irrigation Co. will erect pumping plant with capacity of 210,000 gallons per minute; bids opened February 17.

Tex., Plainview.—E. M. Perry awarded contract to G. E. Green Machinery Co. of Plainview to install 10 irrigation pumping plants; each pump to have capacity of 1500 gallons per minute.

Tex., San Antonio.—Melvine Land & Irrigation Co. incorporated with \$50,000 capital stock by W. R. King, F. G. Hill and T. F. Mangum.

ELECTRIC PLANTS

Ark., Imboden.—Brewer & Gore, Memphis, Tenn., purchased electric-light and water plants; will install boiler and other machinery, rewire entire city, etc.

Ga., Americus.—City will vote March 20 on \$60,000 bond issue for construction of electric-light plant and laying water mains. Address The Mayor.

Ga., Atlanta.—City will engage engineer to make examinations and submit report on recently-noted proposed municipal lighting plant, to estimate cost, suggest locations, etc.; will receive engineer's bids until March 11; J. E. McClelland, chairman electric-light committee. (See "Machinery Wanted.")

Ga., Whigham.—City will vote on \$12,000 bond issue for building electric-light plant, etc. Address The Mayor. (See "Water-works.")

La., Mansfield.—Mansfield Ice Co. completed improvements recently noted. (Recently incorrectly noted under La., Manchester. See "Ice and Cold-storage Plants.")

Md., Myersville.—City will petition Legislature for authority to issue \$8000 of bonds

for construction of electric-light plant and water-works. Address The Mayor.

Mo., Kansas City.—Baker Electric Co. incorporated with \$5000 capital stock by A. J. Pray, R. C. Norton, J. D. Norton, Jr., E. S. Jackson and O. C. Snider.

N. C., Mt. Holly.—W. S. Lee, vice-president of Southern Power Co., Charlotte, N. C., writes to Manufacturers Record: "Southern Power Co. is beginning construction of 10,000 horse-power steam turbine electric plant at Mt. Holly; contract placed with Alphonso Custodia Chimney Construction Co., New York, for stack; with Westinghouse Electric & Manufacturing Co. (Pittsburgh, Pa.) for turbo-generator and condenser, and with Erie City Iron Works (Erie, Pa.) for boilers, stokers and superheaters." Unconfirmed reports state plant will cost \$250,000. (Recently mentioned in "Miscellaneous Construction" under Charlotte.)

N. C., Siler.—City Commissioners granted franchise to J. Wade Siler and W. D. Siler to install electric-light system.

Okla., Pawhuska.—City, J. C. Ferguson, Mayor, will repair and extend electric-light system; bids received until March 4; about 25,180 feet No. 6 weatherproof copper, 130 poles complete with crossarms, etc., 33 300-candle-power tungsten lights, 25-light regulator and transformer, etc.; plans will be on file at office of L. C. Willis, city superintendent of water-works and electric light system. (See "Machinery Wanted.")

S. C., Bishopville.—City contemplates installing 125-horse-power boiler to replace two 60-horse-power boilers in electric-light plant; proposed to use tungsten lamps for street lighting; S. P. Sutton is superintendent.

Va., Franklin.—Factory Hill Power Corporation incorporated with \$5000 capital stock; C. C. Vaughan, president; C. C. Vaughan, Jr., secretary and treasurer.

Tex., Timpson.—Timpson Light & Power Co. incorporated with \$5000 capital stock by J. P. Christopher, Glen Corwine and George M. Bliss.

Va., Richmond.—Virginia Railway & Power Co., C. B. Buchanan, general manager, contemplates completion in October of previously described power-house; contract let for construction of building foundations and machinery; 9000-kilowatt unit.

FERTILIZER FACTORIES

Ala., Dothan.—Home Guano Co. awarded contract to J. M. Morgan & Co., engineers and contractors, Birmingham, Ala., to prepare plans and erect 25-ton fertilizer plant; comprise six buildings; plant cost \$125,000; plans for machinery for power-house will be prepared by Morgan & Co., and for apparatus for acid department by Norman Pikes, superintendent of plant. (Recently mentioned.)

La., Shreveport.—Meridian Fertilizer Factory, S. Eastland, president, Meridian, Miss., advises Manufacturers Record that plans and data are not yet ready for announcement relative to factory recently noted to be erected.

Tex., San Augustine.—San Augustine Fertilizer Co. incorporated with \$5000 capital stock by Sam Parker, John W. Armstrong and George O. Haskell.

FLOUR, FEED AND MEAL MILLS

Mo., St. Louis.—Bernet, Craft & Kauffman Milling Co. will rebuild flour blending plant and warehouse recently reported burned; proposes erecting two-story wood and iron building with fireproof roof; cost \$50,000; is negotiating for site 100x200 feet.

Tenn., Peryear.—Peryear Milling Co. incorporated with \$10,000 capital stock by A. S. Hendricks, T. A. McWilliams, J. E. J. Littleton, J. M. Bumpass and Isaac Freeman. (Previously reported to rebuild flour mill burned at loss of \$9000.)

FOUNDRY AND MACHINE PLANTS

Ala., Bessemer.—United States Cast-Iron Pipe & Foundry Co., L. R. Lemoine, president, 71 Broadway, New York (recently reported to make plant repairs costing \$150,000), states improvements are contemplated, but details have not been worked out.

Ark., Conway.—Andy Hess will erect machine shop; brick construction.

Ky., Central City.—Central City Foundry & Machine Co., E. B. Miller, owner, will rebuild foundry and machine shop recently reported burned.

Ky., Louisville—Stoves.—O. K. Stove & Range Co. contemplates installing additional machinery.

Ky., Louisville—Flour-mill Machinery.—New Idea Co. is being organized to manufacture flour-mill machinery.

Ky., Newport—Iron Furnace.—Newport Rolling Mill Co. awarded contract to McClintic-Marshall Construction Co., Pittsburgh, Pa., to erect boiler-house and extension, 200x250 feet, to main mill; boiler-house will be used to provide power for additional equipment; products of plant include open-hearth iron, black and galvanized sheets and galvanized roofing and siding.

N. C., Charlotte—Oil-mill Machinery, etc.—American Machine & Manufacturing Co. (recently noted to increase capital stock to \$350,000) states will maintain shop and contract business at Charlotte; Greenville plant ready to operate.

N. C., Taylorsville—Corn Mills.—Carson Hubbard Mill Co. incorporated with \$25,000 capital stock by Wilfred P. Carson, John J. Hubbard, John C. Connelly and Taylor O. Teague.

Tex., Fort Worth—Gas Stoves.—Little Giant Stove & Novelty Co. will establish plant to manufacture patented gas stoves; J. H. Greer, president; B. W. Campbell, vice-president; G. H. Colvin, treasurer; D. W. Maddox, secretary and manager; Lewis Alverson, assistant manager. (Recently reported incorporated with \$40,000 capital stock.)

Va., Petersburg—Peanut Harvesters.—American Peanut Harvester Co., H. L. Percival, president, will establish plant to manufacture peanut planters, harvesters and pickers.

GAS AND OIL DEVELOPMENTS

Okla., Bartlesville.—Clara Exploration & Development Co. incorporated with \$10,000 capital stock by Guy M. Woodring, G. F. Woodring and Viola Woodring of Bartlesville; Gus Alberts and George F. Alberts of Alice, Cal.

Okla., Tulsa.—Chance Oil Co. incorporated with \$50,000 capital stock by Thomas White of Tulsa, Paul Konz and E. B. Huston, Independence, Kans.

W. Va., Charleston—Burning Springs Oil & Development Co. incorporated with \$15,000 capital stock by W. F. Coomstock, Charles F. Hoy, R. R. Pennywith, John William Moore and others.

ICE AND COLD-STORAGE PLANTS

Ky., Barbourville.—Mr. Wilder of Pineville, Ky., will erect ice plant.

La., Mansfield.—Mansfield Ice Co., D. G. Petty, president, made repairs and installed additional machinery. (Recently incorrectly noted under La., Manchester. See "Machinery Wanted.")

La., New Orleans.—Dr. A. R. Sprague of Berkeley, Cal. (now directing building and installation of plant at San Benito, Tex.), is reported to contemplate pre-cooling plant at New Orleans. (See Tex., San Benito.)

Mo., Kansas City.—T. S. Leake & Co. will erect frame ice-storage house to cost \$3500.

Mo., St. Louis.—Mountain Ice Co. incorporated with \$300,000 capital stock by P. D. Ball, W. E. Keller, L. B. von Welse, E. R. Bladgen and others.

Okla., Ada.—Ada Ice & Cold Storage Co. incorporated with \$50,000 capital stock by B. H. Frick of Ada; C. W. Dawley, McAlester, Okla., and T. G. McCrosky, Kansas City, Mo.

S. C., Conway.—Quattlebaum Ice Co. has organized with Paul Quattlebaum, president; P. C. Quattlebaum, vice-president; McQueen Quattlebaum, secretary-treasurer; plans being prepared for building; purchased 15-ton ice plant. (Recently reported incorporated with \$10,000 capital stock.)

S. C., Greenville.—Greenville Ice & Fuel Co., John B. Marshall, president, awarded contract to J. R. Lawrence of Greenville to erect tower for condensers; reinforced concrete construction; plans by Fred W. Wolf Company, Chicago, Ill.; machinery purchased; daily capacity 55 tons ice. (Previously noted.)

Tenn., Chattanooga.—Arctic Ice & Coal Corporation, 213 James Bldg. (recently reported incorporated with \$100,000 capital stock by H. S. Chamberlain and others), is ready for bids to erect 100-ton ice plant; proposals may be addressed to B. Brown, 214 James Bldg. (See "Machinery Wanted.")

Tex., Del Rio.—Del Rio Electric Light & Ice Co. will install 30-ton ice plant.

Tex., Fort Worth.—Alford Ice & Fuel Co. incorporated with \$30,000 capital stock by R. W. Alford, John Berger and John M.

Scott to establish ice plant with daily capacity of 50 tons.

Tex., San Benito.—Dr. A. R. Sprague of Berkeley, Cal., will superintend building and installation of proposed pre-cooling plant on St. Louis & San Francisco Railroad; reported that Dr. Sprague contemplates similar plant at New Orleans, La.

Tex., Texas City.—Artesian Ice & Cold Storage Co. incorporated with \$25,000 capital stock by F. B. Davison, C. M. Hackett, C. D. Gustavus and others.

Tex., Trinity.—Trinity Ice Co., J. S. Power, president, awarded contract to erect plant; 30x75 feet; corrugated-iron construction; daily capacity, 15 tons ice; machinery order placed. (Recently noted.)

Tex., Yoakum.—Creamery Dairy Co., San Antonio, Tex., will erect 50-ton ice plant.

W. Va., Bluefield.—Bluefield Ice & Cold Storage Co. will erect brick addition to boiler-room to cost \$1000 and ice-storage building to cost \$2500.

IRON AND STEEL PLANTS

Ala., Birmingham—Iron and Steel.—Billings Process Co. has organized with C. W. Hill as president and treasurer; James R. Billings, secretary, both of Birmingham; A. H. Graves of Chicago, Ill., vice-president.

Ark., Chic.—Virgin Timber Co. has organized with J. G. Bell president, George H. Adams vice-president, W. J. Lockwood secretary-treasurer; capital stock, \$600,000. (Recently reported incorporated.)

Ark., Pine Bluff.—R. M. Fletcher Lumber Co. is not ready to make announcement of plans for development of pine and hardwood timber recently noted purchased; has all machinery required at present.

Ark., Arkansas City.—Grayling Lumber Co. will build hardwood mill with capacity of 120,000 feet daily; acquired Standard Tie Co.'s properties in Desha county; controls 40,000 acres hardwood timber land.

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LAND DEVELOPMENTS

Ala., Geiger.—Pinson & Geiger Land Co. incorporated with \$500,000 capital stock by John H. Pinson, W. L. Waller, Alexander Geiger and others. (Recently incorrectly noted under S. C., Geiger.)

Ark., Walnut Ridge.—Less Land Co. incorporated with \$25,000 capital stock by Isaac Less, Ida Less and Jake Less.

Fla., Ocala.—Cove Company, J. L. Young, president, contemplates development of 17,500 acres of land in Citrus county; character of development not determined; property has 14 miles frontage along Withlacoochee River. (Recently noted incorporated with \$60,000 capital stock.)

Ga., Atlanta.—East Lake Poultry Farms incorporated with \$5000 capital stock by M. L. Harman, J. R. Reynolds and F. C. Coll.

La., New Orleans.—Southern Park Realty Co. incorporated with \$300,000 capital stock; Joseph W. Frankenhush, president; John M. McCloskey, vice-president; R. P. Rordam, secretary-treasurer.

Miss., Chatawa.—Chatawa Land & Development Co. organized by Albert M. Andrews (secretary Peter Gallagher Auction & Real Estate Co.), New Orleans, La.; purchased 100 acres and will improve for establishment of summer colony. Peter Gallagher Auction & Real Estate Co., 334 Carondelet St., New Orleans, La., is selling agent.

Miss., Holmes County.—Southern Plantation Corporation chartered with \$100,000 capital stock to develop, by diversified farming, three plantations, including 1900 acres in Holmes county, Mississippi, and 1200 acres in Lee county, Arkansas; incorporators are Edward M. Davies, Ernest H. Wilson and John R. Young of Chicago; A. A. Parsons and J. J. Williams of Memphis, Tenn.; company's offices will be in Memphis Trust Bldg., Memphis.

N. C., Charlotte.—Patterson Springs Co. incorporated with \$25,000 capital stock by C. E. Mason, H. P. Dew, C. E. Gower and J. J. Harrill.

N. C., Montreat.—Mountain Retreat Asso-

ciation, Rev. R. C. Anderson, president, contemplates further grading, landscape gardening and other improvements to assembly grounds of Southern Presbyterian Church. (See "Hotels.")

Okla., Oklahoma City.—City voted \$250,000 bond issue to purchase land for park purposes. Address The Mayor. (Recently mentioned.)

Tenn., Memphis.—Everglade Development & Improvement Co. increased capital stock by \$30,000.

Va., Kenbridge.—Virginian Industrial Corporation incorporated with \$50,000 capital stock; D. T. Kennedy, president; J. N. Johnson, vice-president; J. T. McKenna, secretary and treasurer.

Va., Norfolk.—Bousen Creek Land Corporation incorporated with \$25,000 capital stock; J. R. Simpson, president; A. J. Bakus, vice-president; Nathaniel Beaman, treasurer; E. S. Ruffin, secretary.

LUMBER MANUFACTURING

Ark., Arkansas City.—Grayling Lumber Co. will build hardwood mill with capacity of 120,000 feet daily; acquired Standard Tie Co.'s properties in Desha county; controls 40,000 acres hardwood timber land.

Ark., Chic.—Virgin Timber Co. has organized with J. G. Bell president, George H. Adams vice-president, W. J. Lockwood secretary-treasurer; capital stock, \$600,000. (Recently reported incorporated.)

Ark., Pine Bluff.—R. M. Fletcher Lumber Co. is not ready to make announcement of plans for development of pine and hardwood timber recently noted purchased; has all machinery required at present.

Ga., Atlanta.—Fry-Rushton Hardwood Co. incorporated with \$15,000 capital stock by H. W. Fray, W. W. Rushton and George C. Spence.

Ga., Thomasville.—Homer Williams will erect saw, stove and lath mills.

La., Coushatta.—James B. Copellar Lumber & Tie Co. organized with \$25,000 capital stock to manufacture lumber, cross-ties, staves, poles and piling; James J. Copellar, president; Joseph C. Copellar, vice-president; John A. Brown, secretary-treasurer.

La., Lake Charles.—Powell Lumber Co., W. P. Weber, president, will operate in connection with present holdings timber recently noted purchased.

La., New Orleans.—J. Numa Jordy is reported as negotiating sale of 60,000 acres timber land to English capitalists for development.

Miss., Richton.—Richton Lumber Co. will enlarge and improve plant; cost \$60,000. (Previously mentioned.)

Mo., Kinder.—South Land & Lumber Co., 524 Liggett Bldg., St. Louis, Mo. (recently noted incorporated with \$100,000 capital stock by A. L. Shoults of St. Louis and others), has not completed organization; will manufacture hardwood lumber; estimated output when fully organized 100,000 feet daily.

Mo., St. Louis.—Payton Lumber & Supply Co. incorporated with \$30,000 capital stock by Cony T. Payton, Harry L. Nipon and William G. Nipon.

Mo., St. Louis.—Forest County Lumber Co. incorporated with \$10,000 capital stock by Casper J. Wolf, Francis J. Wolf and William F. Mahlik.

Mo., St. Louis.—Ray E. Pickrel Lumber Co., Chandlerville, Ill., will erect building for milling logs; 112x52 feet; frame, except boiler-room; electric lighting; cost \$8000; plans by Goodell & Krieling, Chandlerville; construction by company; machinery mainly purchased. (Recently noted. See "Machinery Wanted.")

N. C., Robbinsville.—Whiting Lumber Co., Land Title Bldg., Philadelphia, Pa., is reported as negotiating for 50,000 acres additional to property now controlled; purchase price, \$600,000. (Company development plans previously outlined.)

N. C., Charlotte.—McDowell Lumber Co. incorporated with \$5000 capital stock by F. B. McDowell, J. L. Chambers and W. E. Chambers.

N. C., Point Caswell.—J. C. Pretlow Lumber Co., dealer in lumber, will install dry-kill of 20,000 feet daily capacity. (See "Machinery Wanted.")

Okla., Muskogee.—Marshall Lumber Co. incorporated with \$20,000 capital stock by John S. Marshall, Richard S. Marshall and Geo. S. Marshall.

Tex., Bronson.—W. H. Knox will, it is reported, build sawmill.

Tex., Beaumont.—George W. Smyth Lumber Co., 326 Weiss Bldg., will conduct retail lumber yards; is having plans prepared by

H. C. Mauer for necessary buildings, sheds, etc.; day labor; will purchase material locally; J. B. Smyth, president; J. G. Smyth, vice-president; C. E. Walden, secretary; Frank Alvey, treasurer. (Recently noted in incorporated with \$100,000 capital stock.)

Tex., Livingston.—Choates Creek Lumber Co. incorporated with \$100,000 capital stock; acquired timber rights on 135,000 acres land near Livingston with 160,000,000 feet of standing timber; will build mill with daily capacity of 40,000 feet hardwood lumber; F. W. Harrison, president, St. Louis, Mo.; J. M. Hunsay, vice-president, Houston; William P. Harrison, secretary-treasurer, St. Louis.

W. Va., Huntington.—Superior Lumber Co. has elected T. M. Davidson president, H. A. Davidson vice-president, Edwin H. Mockbee secretary, L. C. Davidson treasurer; purchased land on which to erect sheds, mill and office building. (Recently reported incorporated.)

W. Va., Romney.—South Branch Tie & Lumber Co. incorporated with \$30,000 capital stock by Campbell B. Pancake, Thomas F. Martin, John J. Cornwell and others.

METAL-WORKING PLANTS

Tenn., Chattanooga—Wire Novelties.—J. E. Morelock, superintendent Chattanooga Iron and Wire Works, contemplates establishing plant to manufacture small wire novelties. (See "Machinery Wanted.")

Tex., Fort Worth—Cans.—Lone Star Can Co. incorporated with \$10,000 capital stock by M. L. Eppstein, M. Scharitz and A. B. Wolfson.

MINING

Ky., Marion—Fluorspar, Zinc, etc.—Globe Metals, Rare Earths & Oil Exploration Co. (recently noted incorporated) organized with Hiram Tyrey president, G. W. Wells second vice-president, Lewis J. Ross secretary-treasurer, David C. Lovelace, manager, Salem, Ky.; capital stock, \$3,000,000; will install machinery to develop 7000 acres of fluorspar property in Crittenden and Livingston counties; main office, 1601 Ohio St., Terre Haute, Ind. (See "Machinery Wanted.")

Tenn., Mt. Pleasant.—Phosphate.—Blue Grass Phosphate Co., main office at Cincinnati, O., will develop 500 to 600 acres of phosphate property; daily capacity, 50 tons; G. W. Killebrew, president, Mt. Pleasant; G. James, treasurer.

Mo., Joplin—Lead and Zinc.—Short Creek Mining Co. incorporated with \$15,000 capital stock by Frank Childress, Lee Childress, M. J. von Borries and C. H. Miller.

Mo., Neck—Lead and Zinc.—Company organized by Byron Ash, W. A. Corl, J. B. Gibson and Samuel Bogges to develop lead and zinc properties.

Mo., Neck—Lead and Zinc.—Neck City Mining Co. organized by Frederick Binzier, William Rigney, John Brotherton, John Lee and others; has lease on 10 acres and will develop; erect concentrating plant.

Mo., Thomas Station (not a postoffice)—Lead and Zinc.—W. C. Thomas, Carthage, Mo., is promoting organization of company to develop mine on lease near Thomas Station; proposes to build 150-ton mill.

Okla., Tulsa—Sand.—Bromide Glass Sand Co., Robert Galbraith, president, will develop 160 acres of sand deposits; plans not determined; Charles Chesley, vice-president, may be addressed.

Tenn., Sweetwater—Iron.—Tennessee Ore Co., W. D. Gilman, manager, purchased 150 acres iron-ore land.

Tex., Beaumont—Asphalt.—J. B. Smyth, care of Sabine Tram Co., will develop asphalt property; now developing mine on experimental plan.

W. Va., Moundsville—Sand.—H. D. Truman will develop sand bank on Compton property; machinery ordered.

MISCELLANEOUS CONSTRUCTION

La., New Orleans—Levee.—Doullut & Williams of New Orleans are lowest bidders for construction of creosoted pile bulkhead 160 feet long on east bank of Mississippi River between St. Maurice Ave. and St. Bernard Parish line; Jules C. Koenig is president Orleans Levee Board. (Call for bids lately noted.)

La., New Orleans—Levee.—Pontchartrain Levee District Commissioners will construct levee on Mississippi River, left bank, East Baton Rouge parish, Louisiana; bids received at office of State Board of Engineers, New Orleans, until February 29; J. J. Reine, secretary; Hunter C. Leake, president. (See "Machinery Wanted.")

La., Shreveport.—Caddo Levee Board awarded contract to J. G. Session to con-

direct levee from Twelve-Mile Bayou to Cross Bayou.

Miss., Bay St. Louis—Seawall.—City is reported to construct seawall two miles long, 12 feet high; concrete; also build shell road behind wall; contractors are invited to submit plans and estimates; C. Sanger (informant) states Bond Commission may be addressed.

Miss., Gulfport—Tippie, etc.—Gulf & Ship Island Railroad Co., W. H. Gardner, Jr., chief engineer, Gulfport, awarded contract to Fairbanks-Morse Company, Chicago, Ill., to construct 100-ton coal tippie on piers for coaling vessels; foundation completed; will also have large storage yard in connection; coal to be unloaded by crane and system of scraper buckets used to scrape coal from storage to track hopper and from there to tippie. (Previously noted.)

Miss., Pascagoula—Docks.—Cooney, Eckstein & Co., 66 Broad St., New York, advise Manufacturers Record positive plans are not yet formulated for construction of recently-noted docks on river front.

Mo., Kansas City—Flood Protection.—City Council adopted ordinance providing for construction of four miles of dike to protect East Bottoms from flood; dike will extend from Scott Ave. to mouth of Blue River; from Scott to Grand Ave. ground has been raised above flood level by private interests, but additional work will be necessary, making total of about five and one-half miles of river front involved; total cost will be \$90,496.96, exclusive of right of way; of this amount Government will pay \$105,000 and balance charged to district benefited, which includes 2433 acres. Address The Mayor. (Previously mentioned.)

MISCELLANEOUS ENTERPRISES

Ala., Birmingham—Printing, etc.—Bell Printing Co., W. Roberts, president, 2101 Morris Ave. (recently noted incorporated with \$5000 capital stock to establish printing and engraving plant), will install electrical motors; erect no building. (See "Machinery Wanted.")

Ala., Montgomery—Printing.—Brown Printing Co., J. H. Crenshaw, president, 10 N. Lawrence St., will open bids February 23 to erect printing plant; three stories and basement; fireproof construction; cost \$23,000; plans by Okel & Cooper, Vandiver Bldg., Montgomery. (Previously noted.)

Ark., Fort Smith—Laundry.—Arkansas Laundry awarded contract to R. L. Paines to erect addition to cost \$2500.

Fla., Tampa—Printing Plant.—Tampa Times awarded contract through A. H. Johnson, architect, to Southern Lumber & Supply Co. to remodel building; will occupy entire second floor, with exception of two front offices, as composing department.

Ga., Atlanta—Electrical Appliances.—Morrison Company incorporated with \$50,000 capital stock by Mont Morrison, 262 Houston St., and J. L. Pryor, both of Atlanta, and John Sprague of North Carolina; will develop mechanical and electrical contrivances.

Ga., Atlanta—Crematory.—Special Committee from Board of Health conferring with W. E. Dowd, Jr., and E. L. Penruddocke (Birmingham, Ala.), representatives of Heenan Destructor Co. of New York, to ascertain if crematory can be built for \$400,000 to dispose of city's garbage and generate steam power to furnish electric light and pump water from Hemphill Station; R. M. Clayton, chief of construction. (Previously mentioned.)

Ga., Augusta—Bottling.—Aqua Distilling & Bottling Co. (recently noted incorporated with \$25,000 capital stock by W. S. Morris and others) will establish plant for distilling, aerating and bottling drinking water, etc.; William S. Richardson, Candler Bldg., Atlanta, Ga., is interested. (See "Miscellaneous Factories" and "Machinery Wanted.")

Ky., Lexington—Printing.—Citizens' Printing & Publishing Co. incorporated with \$5000 capital stock by Clarence Egbert, Daniel Crowe, J. J. O'Brien and Margaret R. Turner.

Mo., Barnett—Elevator.—Barnett Elevator Co. incorporated with \$5000 capital stock by W. T. Miller, W. A. Houston, E. A. Williams, J. B. Ronton and C. L. Hatler.

Mo., St. Louis—Steel Barge Line.—St. Louis-Gulf Steel Barge Line Co. will operate barge line; at present three steel barges and one iron-bottom towboat will be placed in service; Robert H. Whitelaw, president; A. L. Shapleigh, vice-president of organization committee of company. (Recently noted organized with \$300,000 capital stock.)

N. C., Charlotte—Printing.—Charlotte News Publishing Co., W. C. Dowd, president, will erect printing plant.

N. C., Greenville—Publishing.—Baptist Courier Publishing Co. has plans and will soon award contract for erection of proposed building; brick; 27x125 feet; one story; plate-glass front.

N. C., Wysocking—Transportation.—Lake Landing Transportation Co. incorporated with \$25,000 capital stock by John L. Mann, T. J. Mann, S. M. Fisher and others.

Okla., Cache—Supplies.—Cache Supply Co. incorporated with \$10,000 capital stock by Steve Leckie, E. M. Leckie and Beulah Brown.

Okla., Mangum—Publishing.—Sun Monitor Publishing Co. incorporated with \$5000 capital stock by R. P. Miller, S. E. Echols, F. H. Sweet and G. L. Wilson, Sr.

Okla., Nowata—Construction.—Davis Construction Co. incorporated with \$5000 capital stock by W. A. Davis, Hugh Branson and M. G. Bransen.

Okla., Stringtown—Asphalt.—Southern Asphalt & Construction Co. incorporated with \$25,000 capital stock by George D. Moulton of Stringtown, John D. Masters, Sherman, Tex., and others.

Okla., Tulsa—Oil-well Supplies.—Continental Supply Co., Summer Merrick, president, St. Louis, Mo., is subsidiary company to Youngstown Sheet & Tube Co., Youngstown, O., and will handle products manufactured by that company; will not build works in Oklahoma, but establish branch store and pipe yards for general oil and gas-well supplies. (Recently noted organized with \$1,000,000 capital stock under "Miscellaneous Factories.")

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S. C., Columbia—Laundry.—Columbia Laundry Co. organized with H. B. Hammond, president; J. J. Cain, vice-president; H. J. Gregg, secretary-treasurer; will erect two-story building to be equipped as laundry; awarded contracts for machinery. (Recently reported incorporated.)

S. C., Columbia—Publication.—Lutheran Board of Publication, Rev. W. H. Greever, manager, Columbia, S. C., receives bids until noon February 27 for erection of four-story brick store and office building; certified check, 2 per cent. of proposal; plans and specifications may be obtained from J. B. Urquhart, architect, 513 National Loan & Exchange Bank Bldg., Columbia, upon deposit of \$15 for prompt return of plans and specifications. (Previously mentioned.)

Tenn., Knoxville—Laundry.—A Schonbrunn is having plans prepared by Baumann Bros. of Knoxville for third story to building at Walnut and Asylum Aves.; will install steam laundry in connection with steam drying and dyeing plant.

Tenn., Memphis—Gas Plants.—Knoxville Fireproof Lighting Co. incorporated with \$5000 capital stock by Ben A. Morton, Frank Sanders, G. M. Ogle, Solon S. Kipp and S. R. Buffatt to install gas plants for individual companies; will continue established enterprise.

Tenn., Memphis—Printing and Lithographing.—D'Ardell Printing & Lithographing Co. incorporated with \$10,000 capital stock by R. M. Austin, G. H. Bruning, Walter C. Nallau and others.

Tex., San Antonio—Publishing.—International Publishing Co. incorporated with \$10,

000 capital stock by H. M. Madison, G. E. Gwinn, Ellis Chaney and Giraud Fraser.

Va., Chase City—Hardware.—City Hardware Co. incorporated with \$10,000 capital stock; J. S. Mason, president; W. F. Wood, secretary and treasurer.

Va., Petersburg—Crematory.—Board of Aldermen authorized \$25,000 bond issue for crematory; election in June. Address The Mayor.

W. Va., Huntington—Paper and Woodenware.—Huntington Paper & Woodenware Co. incorporated with \$5000 capital stock by Winfield Scott, John F. Hubbard and Sallie Scott of Grayson, Ky.; John H. Culton and Grace Culton of Lexington, Ky.

MISCELLANEOUS FACTORIES

Ala., Coaling—Incubators.—Southern Incubator Co., Birmingham, Ala., leased building and purchased planers, etc., to equip plant to manufacture incubators and brooders; L. A. Clayton, president; R. C. Reid, vice-president and manager; J. F. Franklin, secretary. (Recently noted under "Birmingham.")

D. C., Washington—"Blaugas" Plants.—Chesapeake Blaugas Co., 819 17th St. N. W., is being incorporated to manufacture "blaugas" in Maryland, Delaware, District of Columbia and Virginia.

Florida—Sugar Mill.—Martin & Borders, 229 Midland Bldg., Kansas City, Mo. (previously noted) to contemplate erection of large sugar mill, state they propose putting in cane about 10,000 acres land bordering on Lake Okeechobee and erecting mill to manufacture product; will dredge canal from lake to

Seth Curlin of Union City, Tenn., contemplates establishing plant to manufacture waterproof coats, etc.

Ky., Hopkinsville—Monuments.—McClaine & Armstrong (B. F. McClaine and E. H. Armstrong) will erect plant for marble and granite monuments; showroom 60x30 feet; shop 20x22 feet; office 16x16 feet; stock barn 40x60 feet; cutting shed 60x300 feet; plans by Mr. McClaine; machinery purchased. (Recently noted.)

Ky., Louisville—Railroad Jack.—Pneumatic Jack Co., J. S. Leake, manager, Paul Jones Bldg., proposes establishing plant to manufacture patented jack used in railroad work.

La., New Orleans—Coffee.—Quetzal Coffee Co., Jacob Block, president, 523 Natches St., has rented building and will operate coffee plant; cost of machinery (installed), \$5000. (Recently noted incorporated with \$15,000 capital stock.)

La., Bogalusa—Wood Alcohol.—Southern Wood Distillates & Fiber Co., Geo. R. Wright, president and general manager, American Trust Bldg., Chicago, Ill., states negotiations are on for four plants in different sections of South, but definite contracts are not yet made; Bogalusa plant is nearing completion.

Md., Baltimore—Cigars.—Elliott, Ottenheimer & Elliott, 109 W. Lombard St., awarded contract to Henry L. Mass, 1119 Ensor St., Baltimore, to erect two additional stories to cigar factory at 2113-2117 E. Oliver St.; brick; slag roof; plans by Louis Levi, 610 American Bldg., Baltimore.

Md., Baltimore—Bakers' Utensils.—G. H. Wahmann Manufacturing Co., 130 N. Greene St., leased four-story building at 520 W. Baltimore St. and will equip for manufacturing bakers' utensils.

Md., Baltimore—Beverages.—Limko Company incorporated with \$25,000 capital stock by Jacob H. Nicholson (2630 N. Charles St.), Harry R. Nicholson and Christopher R. Wattenscheidt.

Md., Baltimore—Bottling.—Gottlieb-Baurnschmidt-Straus Brewing Co., Hanover and Conway Sts., awarded contract to Fred Decker & Son, 1209 E. Biddle St., Baltimore, to erect one-story bottling plant at Oliver and Chester Sts.; brick; stone trimmings; one story; 44x100 feet; cost about \$10,000. (Company recently stated to improve plants.)

Md., Baltimore—Sausage, etc.—W. Salganik & Sons, Lombard and Exeter Sts., is negotiating for building in which to install machinery for manufacturing sausage and other meat products; proposes organizing company with \$50,000 capital stock.

Miss., Hattiesburg—Wood Products.—J. H. Gaston, Moss Point, Miss., awarded contract to H. F. Huestis, Pass Christian, Miss., to erect plant (recently noted) to manufacture turpentine, rosin, etc.; buildings include boiler-house 36x60 feet, one story; main building 49x85 feet, three stories; tankhouse and office building; machinery will include 75-horsepower twin engine, three 80-horsepower boilers, steam superheater, hog and shredder; daily capacity 20 barrels turpentine, 40 barrels rosin, 2 barrels pine oil and 2 barrels wood alcohol. (See "Machinery Wanted.")

Mo., Canton—Panama Manufacturing Co. incorporated with \$5000 capital stock by C. W. Barrett, George L. McCutcheon, P. N. Hanna and others.

Mo., Boonville—Monuments.—R. L. Moore & Son, 650 Morgan St., awarded contract to W. J. Cochran, Boonville, to erect addition to plant; 110x20 feet; plans by S. W. Ravenel, Boonville; machinery purchased. (Recently noted to have purchased machine shop and to equip for manufacturing marble and granite monuments.)

Mo., Fulton—Clothing.—Dunavant-Gilman Clothing Co. incorporated with \$5000 capital stock by E. W. Dunavant, B. B. Gilman and W. R. Taylor.

Mo., Kansas City—Roofing.—Banner Roofing Co. incorporated with \$5000 capital stock by Albert Johanns, James B. Raming and F. E. Ryman.

Mo., St. Louis—Robert Merz will erect two-story factory costing \$14,000 at 1214-1224 Mississippi Ave. and 1921-1929 Rutger St.

Mo., St. Louis—Railway Devices.—Railway Devices Co. incorporated with \$5000 capital stock by Louis A. Hoerr and John Kiburz of St. Louis and E. Chaffee, Maplewood, Mo.

Mo., St. Louis—Shoes.—Non-Royalty Shoe Co. incorporated with \$100,000 capital stock by W. F. McElroy, J. H. Ballard, H. C. Whiteside, T. H. Goddard and others; will install shoe manufacturing machinery in building at 22d and Pine Sts.

Mo., St. Louis—Paper Boxes.—Winter-Langenbeck Folding Box Co. will erect factory; two stories; 12x106 feet; 27,000 square feet floor space; brick and reinforced concrete; fireproof; cost \$14,000.

Ky., Hickman—Waterproof Coats, etc.—

In writing to parties mentioned in this department, it will be of advantage to all concerned if the Manufacturers Record is mentioned.

Mo., St. Louis—Bakery.—Papendick Bakery Co., 3611 N. 22d St., purchased site at Florissant Ave. and Palm St. on which to erect bakery to cost about \$35,000.

Mo., St. Louis—Clothing.—Jungmann-Landecker Garment Co. incorporated with \$8000 capital stock by Arthur Jungmann, Fannie Jungmann, Abraham Landecker and Carrie B. Landecker.

N. C., Elizabeth City—Boats.—J. H. Hunt will construct plant to build canal boats; construction begun.

N. C., Saginaw—Pipe Organs.—Joseph G. Ciprian will establish pipe organ factory.

Okla., Oklahoma City—Ice-cream.—Purity Ice-cream Co. incorporated with \$12,000 capital stock by J. T. Wheaton, A. N. Wheaton and R. O. Brewer.

Okla., Okmulgee—Oil Refinery.—American Refining Co. incorporated with \$10,000 capital stock by J. F. Campion and C. L. Thomas of Muskogee, Okla., and Walter Henning of St. Louis, Mo.

Tenn., Chattanooga—Paper Boxes, etc.—Andrews Paper Box Co. incorporated with \$25,000 capital stock by O. B. Andrews, T. R. Preston, Z. C. Patton, Jr., Lewis Coleman and S. T. Lewis.

Tenn., Memphis—Candy.—Chickasaw Candy Co. purchased site with frontage of 100 feet on which to erect factory building to cost \$35,000; will equip for annual capacity 5000 pounds candy; E. W. Horton is president.

Tenn., Memphis—Ink.—Indestructible Ink Co. organized with Dean Adams, president; C. W. Schwill, secretary-treasurer, and J. C. Clark, chemist; has plans for building; contemplates increasing capital stock from \$5000 to \$50,000.

Tenn., Nashville—Pearl Buttons.—H. J. Boyer, Sheffield, Ala., is conferring with Nashville Industrial Bureau relative to establishment of pearl button factory to utilize shells of Cumberland River and other nearby tributaries.

Tex., Port Arthur—Gas.—J. S. Connell, Carthage, Mo., has municipal franchise to construct gas works.

Tex., Houston—Burlap and Cotton Bags.—Texas Bag & Fiber Co. will build to replace present plant after latter is sold; now preparing to draw plans, but may not build for several years, as new construction will not be authorized until sale mentioned is effected.

Tex., Houston—Pulverizing.—Commercial Pulverizing Co. incorporated with \$5000 capital stock by W. Morgan, J. C. Page and Thomas S. Page.

Tex., Houston—Boyd Manufacturing Co. incorporated with \$7500 capital stock by John Boyd, S. E. Boyd and J. V. Dealy.

Va., Alexandria—Glass.—Alexandria Glass Works increased capital stock from \$25,000 to \$75,000.

Va., Pine Beach.—Greystone Manufacturing Co. incorporated with \$35,000 capital stock; H. G. Elchelberger, president; A. L. Fry, vice-president; H. S. Baker, secretary.

Va., Richmond—Fire-extinguishing Apparatus.—Southern Fire Prevention & Specialty Corporation incorporated with \$100,000 capital stock.

MOTORS AND GARAGES

Ala., Birmingham—Garage.—Magic City Touring Co. incorporated with \$2000 capital stock; Gertrude Plitz, president; L. J. Lehanoff, vice-president; Max Plitz, secretary and treasurer.

Ky., Frankfort—Garage.—Nicol Motor Car Co., 109 E. Main St., awarded contract to Capital Lumber Co., Frankfort, to erect building; 53x110 feet; practically fireproof construction; plans by J. R. Smith, Frankfort; R. C. Nicol is president. (Recently noted incorporated with \$1000 capital stock.)

Md., Baltimore—Automobiles.—Calvert Motor Co. incorporated with \$10,000 capital stock by Frank G. Kitchin, 1421 Mt. Royal Ave.; George J. Kessler, 321 St. Paul St., and Frank Luthardt.

Tex., Galveston—Christensen Automobile Co. has plans by Stowe & Stowe to erect garage; bids will be invited soon. (Lately noted.)

Va., Charlottesville—Garage.—R. L. Thomas has contract to erect garage at Market and 6th Sts.; concrete; fireproof; vapor heating system; cost \$14,000.

Va., Portsmouth—Garage.—Emmerson estate awarded contract to C. M. Major, Norfolk, to erect garage on High St.; two stories; brick; cost \$5800.

RAILWAY SHOPS, TERMINALS, ROUNDHOUSES, ETC.

Ga., Savannah—Atlantic Coast Line Railroad, E. B. Pleasants, chief engineer, Wil-

lington, N. C., contemplates improving cotton terminal facilities.

Ga., Savannah—Central of Georgia Railway, C. K. Lawrence, chief engineer, Savannah, is preparing plans for additional terminal facilities.

Mo., St. Louis—St. Louis Southwestern Railway, F. H. Britton, general manager, St. Louis, proposes construction of terminal facilities at St. Louis and other points; will issue \$7,500,000 of bonds to provide for these and other improvements. Mr. Britton wires Manufacturers Record: "Terminal construction St. Louis includes five-story freight-house 750 feet long; house and team tracks to hold approximately 240 cars under way; will be completed June 1; work not started at other cities; details not complete." Mr. Britton also writes: "Depot building is of steel and reinforced concrete; tracks laid with 75-pound steel rail; driveways paved; contemplate erection of freighthouse and team tracks at Fort Worth and have in mind enlargement or construction of additional terminals at several other cities."

N. C., Spencer—Southern Railway Co., H. W. Miller, assistant to president, 619 Equitable Bldg., Atlanta, Ga., will repair roundhouse. (Recently reported damaged by company's force.)

Tenn., Memphis—H. McDonald, chief engineer Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn., states roundhouse, machine shops, etc., recently noted are not contemplated for near future.

Tex., Waco—Missouri, Kansas & Texas Railway, A. D. Bethard, general manager, Dallas, Texas, is reported as preparing to begin construction of shops, roundhouse, turntables, etc., costing more than \$300,000. Mr. Bethard wires Manufacturers Record: "Plans not yet entirely perfected." (Previously mentioned.)

Va., Roanoke—Norfolk & Western Railway, C. S. Churchill, chief engineer, will erect 55-foot addition to erecting shop and install traveling cranes.

ROAD AND STREET WORK

Ark., Pine Bluff—City will pave about 17 blocks of pavement; probably asphalt material; M. E. Bloom, member of Commission; W. J. Parkes, engineer, Citizens' Bank Bldg., Pine Bluff.

Ala., Chatom.—Washington county will grade, drain and surface with sand-clay about five miles of State Aid road; bids received until March 4; W. S. Keller, State Highway Engineer, Montgomery, Ala. (See "Machinery Wanted.")

Ala., Eutaw.—Greene county contemplates voting on \$120,000 bond issue for road improvement. Address County Commissioners.

Ala., Roanoke.—Randolph county will grade, drain and surface with sand-clay about five miles of State Aid road; bids received until February 21; W. S. Keller, State Highway Engineer, Montgomery, Ala.

Ala., Moulton.—Lawrence county will vote March 18 on bond issue for road construction. Address County Commissioners.

Ala., Rockford.—Coosa County Commissioners appropriated \$4000 toward construction of road through county; State appropriated \$4000, making \$8000 available.

Ala., Uniontown.—City will expend \$10,000 to construct concrete sidewalks recently noted; bids opened within 30 days; D. P. Coleman, Mayor. (See "Machinery Wanted.")

Ark., Helena.—District No. 6 awarded contract to Roche & Manigan Paving Co., Memphis, Tenn., for construction of 20,000 square yards brick paving; cost \$60,000; E. A. Kingsley, engineer, Little Rock, Ark. (Bids recently noted.)

Ala., Red Bay.—Franklin county and State will construct model road through Red Bay; city secured \$4700 by subscription and State will appropriate \$8000; Commissioners' Court passed order appropriating \$15,000 additional for Russellville and Newburg and Russellville and Rockwood Rds. Address County Commissioners.

Ga., Augusta.—City will set and lay granite curbing and cement walks at Barrett Plaza in front of Union Depot; about 1100 linear feet straight curb, 130 feet round curb and 15,000 square feet cement walk; bids received until February 27; Nisbet Wingfield, City Engineer and Commissioner Public Works. (See "Machinery Wanted.")

Ga., Gibson.—Glassecock county will vote on \$33,000 bond issue for road construction. Address County Commissioners.

Ga., Waycross.—City awarded contract to J. P. Brandewire & Co., Birmingham, Ala., to construct 50,000 square yards cement sidewalks; H. D. Reed, Mayor; H. M. Pafford,

engineer in charge. (Call for bids lately noted.)

Ga., Whigham.—City will vote on \$12,000 bond issue for improving streets, etc. Address The Mayor. (See "Water-works.")

La., Baton Rouge.—Police Jury of East Baton Rouge parish ordered graveling of Bayou Sara Rd. from city limits to plant of Standard Oil Co.; cost \$4000.

La., Crowley.—City will pave 30,000 yards of Parkerson Ave.; cost \$60,000 to \$70,000; R. J. Boudreaux, City Clerk.

La., Shreveport.—Caddo parish will grade, drain and macadamize or gravel 25 miles of road; bids received until March 14; J. T. Bullen, parish engineer. (See "Machinery Wanted.")

Md., Baltimore.—Paving Commission, R. Keith Compton, chairman, City Hall, approved specifications for \$368,000 of paving contracts in various sections. H. K. McCay, chief engineer, City Hall, advises Manufacturers Record that following contract for street paving will be ready for advertisement by February 21: 13,000, 10,000 and 5500 yards sheet asphalt or bituminous concrete over cobblestones; 4000 and 6700 yards vitrified brick on concrete; 2000 and 2400 yards of granite block on concrete; specifications for each of these contracts may be had on application to secretary of Paving Commission on deposit of \$5.

Md., Rockville.—Bethesda and Potomac districts of Montgomery county contemplate voting on \$50,000 bond issue to assist Chevy Chase to Great Falls Land Co. construct proposed nine-mile boulevard, previously mentioned, from Chevy Chase Circle to Great Falls. Address County Commissioners.

Md., Denton.—Caroline County Commissioners have \$75,000 bond issue available for constructing macadam and gravel roads; John Sparks, Commissioner. (Recently noted.)

Md., Preston.—State roads engineers, under supervision of R. A. Anderson, completed survey of three miles from Preston to Grove on road to Denton; \$200,000 secured by private subscription. Address Caroline Commissioners, Denton, Md.

Miss., West Point.—City will receive bids until March 12 for grading and graveling E. Main St.; work includes 1137 cubic yards grading and 91,555 square feet novaculite macadam; C. L. Wood, engineer, Columbus, Miss.; J. L. Young, City Clerk. (Recently mentioned. See "Machinery Wanted.")

Miss., Vicksburg.—City voted \$100,000 bond issue for street improvements. Address The Mayor. (Recently mentioned.)

Mo., Carterville.—City will construct combined concrete curb and gutter on both sides of Main St. from Allen St. to Fletcher Ave.; bids received until March 7; F. B. Newton, City Engineer. (See "Machinery Wanted.")

Mo., St. Louis.—City awarded contract to G. W. Gonnell Company of St. Louis to pave four alleys with vitrified brick, and L. R. Flagg Company of St. Louis for paving several alleys also with vitrified brick.

N. C., Fayetteville.—Cumberland county will vote May 6 on \$200,000 bond issue for road improvements. Address County Commissioners.

S. C., Orangeburg.—City awarded contract to Clayton Berghans and J. C. Fairley of Orangeburg at \$15,555.85 for vitrified brick paving on E. Russell and S. Broughton Sts.

Tenn., Madisonville.—F. G. Phillips of Bristol, Tenn. (previously noted engaged to survey Monroe county roads) advises Manufacturers Record that surveys have been made of about 100 of the 150 miles to be built; expects to complete surveys and be ready to let grading contract about April 1; J. H. Patton of Sweetwater, Tenn., is chairman, and C. A. Lowry, Madisonville, secretary of Monroe County Pike Commission. Address Secretary.

Tenn., Memphis.—City Commission will consider 25 street-improvement ordinances February 27; streets to be improved will include Ayers, Florida, Decatur, Olympic, Delaware and others; estimated cost, \$300,000.

Tenn., Memphis.—Colonial Trust Co. awarded contracts aggregating \$40,000 for laying sidewalks and constructing gutter in subdivision.

Tenn., Memphis.—City will pave Georgia Ave. from Lauderdale to Walnut St.; 2600 cubic yards excavation, 8100 square yards dollarway pavement, 510 linear feet curb re-set, 220 linear feet 24-inch pipe, 235 linear feet 18-inch pipe, 60 linear feet concrete culvert, 100 cubic yards excavation for culvert, 10' inlets and 5 manholes; bids opened February 20; E. H. Crump, Mayor; Ennis M. Douglass, City Clerk.

Tenn., Selmer.—City will construct con-

crete sidewalks; plans only in tentative stage; J. C. Houston, Mayor.

Tex., Bastrop.—Commissioners' Court will be petitioned to order election in Commissioner's Precinct No. 2 for voting on \$100,000 bond issue to construct 40 miles of roads.

Tex., Beaumont.—City will construct about \$3,000 square yards paving on concrete foundation with vitrified brick, asphalt, bitulithic, creosoted wooden blocks or other material; also 37,000 linear feet concrete curb; bids received until March 5; J. G. Sutton, City Secretary. (Recently mentioned. See "Machinery Wanted.")

Tex., Centerville.—Leon county will construct about 45 miles of sand-clay roads; amount available, \$84,000; J. Gibbons Browne, engineer, Houston, Tex.; plans will be completed in 30 days; W. D. Lacy, County Judge. (Bond issue recently noted approved.)

Tex., Galveston.—Galveston County Commissioners awarded contract to Hanson Bros. of Galveston at \$27,500 to grade, shell, bulkhead and otherwise improve Avenue 8 Rd. down island from 7th to 13th milepost, about 6½ miles; John M. Murch, County Auditor. (Call for bids lately noted.)

Tex., Greenville.—City will pave 10 blocks of Jordan St. with bitulithic. Address The Mayor.

Tex., Gilmer.—Upshur County Commissioners will expend \$3000 to construct 13 miles of roads 25 feet wide; contract recently noted awarded to C. H. Wilson of Gilmer.

Tex., Houston.—Harris County Commissioners authorized construction of paved road three miles long from point on Telephone Rd. to Harrisburg.

Tex., Lufkin.—Angelina county contemplates road improvements to cost \$200,000. Address County Commissioners.

Tex., Palo Pinto.—Precinct No. 1 of Palo Pinto county will vote on \$100,000 bond issue for road construction. Address County Commissioners.

Tex., Richmond.—Fort Bend county will petition County Commissioners' Court for establishment of road district and for authority to vote on \$75,000 bond issue for road construction. Address County Commissioners.

Tex., San Benito.—City will vote March 3 on \$18,000 bond issue for street improvements and sewer construction. Address The Mayor.

Tex., Taylor.—City will vote March 19 on \$25,000 bond issue to pay city's share of cost of paving Main and other business streets with vitrified brick, creosoted block or other material. Address The Mayor.

Tex., Teague.—City will construct concrete sidewalks and curbs; cost \$15,000; J. Bibbons Browne, engineer, Houston, Tex.; date of opening bids not set; J. H. King, Mayor. (Recently noted.)

Va., Graham.—Tazewell County Supervisors awarded contract to Chandler & Co. and Hart & Hall of North Carolina to construct and improve Graham streets and roads; contract covers 5¼ miles of road work.

Va., Petersburg.—Board of Aldermen authorized \$50,000 bond issue for street improvements; election in June. Address The Mayor.

Va., Portsmouth.—Common Council authorized \$100,000 bond issue for street paving. Address The Mayor.

Va., Portsmouth.—City will receive bids until February 28 for improvement of certain streets in Seventh ward; improvements to consist of placing concrete under street-railway tracks, paving 16,000 square yards of roadways with bituminous macadam, constructing combined concrete curb and gutters on Pearl St., and for furnishing, spreading and rolling on Pearl St. roadway crushed stone eight inches deep; D. F. Appenzeller, chairman Seventh Ward Local Board. (See "Machinery Wanted.")

Va., Tazewell.—Tazewell County Supervisors rejected bids for grading, draining and macadamizing 113 miles of road in Clear Fork, Jeffersonville and Maiden Springs districts; board proposes undertaking work under its own supervision and reached tentative agreement to purchase two complete outfits of crushers, drills, rollers, etc., for each district; D. B. Daniel, chairman Supervisors. (Call for bids lately noted.)

SEWER CONSTRUCTION

Ala., Bay Minette.—City awarded contract to Bay Minette Concrete Co., Bay Minette, for 1200 feet sewer pipe recently noted.

Ark., Batesville.—Sewer District No. 2 will construct sewer system consisting of 11,000 feet 6-inch pipe, 3575 feet 8-inch pipe, 2700 feet 10-inch pipe, with manholes, flush tanks, etc.; bids received until March 1; George L. Bevins, secretary. (See "Machinery Wanted.")

Ala., Boyles.—Sullivan, Long & Haggerty, Bessemer, Ala., are lowest bidders at \$35,000

for construction of 2 miles of county sanitary sewer near Boyles; specifications call for 24-inch terra-cotta sewer main, reducing down to 12 inches; L. H. Salter is sanitary engineer. Board of Revenue of Jefferson County, 101 Courthouse, is in charge. (Call for bids lately noted.)

Ark., Van Buren.—City will construct four miles of sanitary sewers to empty into Arkansas River; two miles of 12-inch and two miles of 8-inch vitrified pipe; will probably open bids in about 90 days; W. B. Bell, Box 364, engineer. (Preliminary surveys, etc., recently noted.)

Mo., Hannibal.—City receives proposals until 12 noon February 29 for sanitary and storm-sewer construction, district No. 200; W. H. Youse, City Clerk. (Recently noted. See "Machinery Wanted.")

N. C., Monroe.—City, J. E. Efrd, Mayor, contemplates expenditure of about \$30,000 on sewer construction; open bids about May; cost of disposal plant about \$5000; engineer not selected. (Contemplated bond issue recently noted. See "Machinery Wanted.")

Tex., San Benito.—City will vote March 9 on \$48,000 bond issue for sewer construction and street improvements. Address The Mayor.

Tex., Texarkana.—City will vote on bond issue for construction of sewer system in Improvement District No. 2, constituting Rose Hill section of city. Address The Mayor.

Va., Petersburg.—Board of Aldermen authorized \$50,000 bond issue for sewers and water main; election in June. Address The Mayor.

TELEPHONE SYSTEMS

Ala., Cullman.—Citizens' Telephone Co. is being organized with \$3000 capital stock.

Ark., Imboden.—Town granted 10-year franchise to Smithville Rural Telephone Co., Smithville, Ark., to construct telephone system.

Fla., Brooksville.—Florida Telephone Co. will make improvements to telephone system, including office quarters of four or five rooms, cable, main lines, new poles and crossarms.

Ga., Rome.—Rome & Farill Telephone Co. incorporated by John Paul Farill and others.

Ky., Hartford.—Hartford Telephone Co. incorporated with \$10,000 capital stock by William W. Crawford, W. T. Hale and J. Joseph Hettinger, all of Louisville, Ky.

Miss., Jackson.—G. B. Merrill Co. incorporated with \$250,000 capital stock by Philip S. Merrill and Edward W. McLaughlin, both of Jackson, and John E. DuBois of DuBois, Pa. N. C., Walkertown.—Bethlehem Telephone Co. will construct 10 miles of telephone line; bids for construction opened February 10; supplies ordered. (Franchise recently noted granted at Winston-Salem, N. C.)

Okla., Gracemont.—Gracemont & Hillsdale Rural Telephone Co., W. C. Drake, president, will construct six miles of rural telephone line. (Recently noted incorporated.)

Tex., Mullin.—West Texas Telephone Co. will erect telephone exchange.

TEXTILE MILLS

Ga., Griffin.—Cotton Cloth.—Georgia Cotton Mills organized with Clyde L. King of Atlanta, Ga., as chairman of directors; latter include Bolling H. Jones of Atlanta, Roswell H. Drake of Griffin, A. Minis of Savannah, Ga., and others; company will operate plants formerly known as Spalding, Central and Boyd-Manghan mills; plans improvements costing \$25,000. (Recently reported incorporated.)

N. C., Graham.—Cotton Cloth.—Travora Manufacturing Co. will build 64x60-foot napper-room to be equipped with nappers now in mill.

N. C., Graham.—J. H. White, president of Travora Manufacturing Co., is not planning to build mill; recent report was error.

Va., Virgilina.—Hosiery.—Virgilina Hosiery Mills increased capital stock to \$12,000 and ordered additional machinery.

W. Va., Martinsburg.—Hosiery.—Kilbourn Knitting Machine Co. will erect additional building; has not yet approved plans; now operates 1600 knitting machines, dyeing and finishing equipment, etc.; executive offices at New Brunswick, N. J.

WATER-POWER DEVELOPMENTS

Ark., Little Rock.—Dixie Power Co. incorporated with \$10,000 capital stock by George B. Rose (president), W. E. Hemingway and J. P. Loughborough.

Ga., Carnesville.—Franklin Light & Power Co., W. W. Lotspeich, president, Box 512, Atlanta, Ga., has not completed organization;

will construct concrete dam on Broad River; open bids about May 1; develop 800 horsepower at present; 25 miles transmission; 12,000 volts. (Recently noted chartered with \$150,000 capital stock to develop water-powers and transmit electricity to Royston, Canon, Bowersville and Carnesville, in Franklin and Hart counties.)

Ga., Macon.—Georgia Power Co. will apply to City Council for franchise to distribute electricity; proposes transmitting electricity by steel tower transmission lines, in duplicate circuit, from generating plants at Tallulah, Buford and other locations; main office, 144 Edgewood Ave., Atlanta, Ga.; Macon office at 504 Grand Bldg. (Developments of Georgia Railway & Power Co. previously detailed.)

N. C., Montreat.—Mountain Retreat Association, Rev. R. C. Anderson, president, proposes to develop water-power and construct electric-light system. (See "Hotels.")

Tenn., Newport.—Dr. Carmichael of Asheville, N. C., is interested in plan to develop water-power on French Broad River, two and one-half miles from Newport; construct 75-foot dam, developing 20,000 to 25,000 horsepower; cost estimated at \$1,250,000.

WATER-WORKS

Ala., Stevenson.—City will vote March 4 on \$14,500 bond issue for construction of water-works; J. K. Shofner, Mayor.

Ark., Imboden.—Brewer & Gore, Memphis, Tenn., purchased water and electric-light plant; will install boiler and other machinery, rewire entire city, etc.

Ga., Americus.—City will vote March 20 on \$60,000 bond issue for laying water mains and construction of electric-light plant. Address The Mayor.

Ga., Unadilla.—City awarded contract to Schofield's Sons Company, Macon, Ga., to construct 100,000-gallon water tank on 100-foot tower and to W. H. Hogsett to drill well.

Ga., Whigham.—City will vote on \$12,000 bond issue for extending water-works, building electric-light plant and improving streets. Address The Mayor.

Md., Myersville.—City will petition Legislature for authority to issue \$8000 of bonds for construction of water-works and electric-light plant. Address The Mayor.

Miss., Vicksburg.—City voted \$400,000 bond issue for purchase of water-works. Address The Mayor. (Recently mentioned.)

N. C., Charlotte.—Water Commissioners awarded contract to Rankin & Burns at \$4726 to erect shops 36x68 feet, stable 18x42 feet and wagon shed 18x18 feet; brick construction; also for engineer's cottage at Catawba River.

Okla., Oklahoma City.—City voted \$100,000 bond issue for water-works improvements, to be expended as follows: Installation of 10,000-gallon pump, \$34,500; discharge pipes and suction lines, \$11,500; housing new equipment and installation of oil burners, \$16,000; two boilers, \$13,000; compensation of the three engineers to investigate and report on permanent water supply, \$10,500; expense of engineers in making necessary examinations, \$14,500. Address the Mayor. (Recently mentioned.)

S. C., Columbia.—City awarded contract to American Machinery & Manufacturing Co., Charlotte, N. C., at \$5891.67 to repair power pumping station at water-works; work will consist of resetting pumps on new foundation, new shafting, reboring water-wheels, pedestals for boxes, etc.; F. C. Wyse, engineer-superintendent. (Call for bids lately noted.)

Tex., Alice.—City will make improvements to water-works system; plans by O'Neill Engineering Co., 1503 Praetorian Bldg., Dallas, Tex.; bids received February 26 for boiler, pump, air compressor, etc. (Recently noted. See "Machinery Wanted.")

Tex., Malone.—Malone Water Co. will construct water-works.

Tex., Pecos.—City is considering construction of pipe line to furnish city with soft water; cost estimated at \$65,000 to \$80,000. Address The Mayor.

Va., Petersburg.—Board of Aldermen authorized \$50,000 bond issue for water mains and sewers and \$25,000 for auxiliary water supply; election in June. Address The Mayor.

W. Va., Bluefield.—Bluefield Water-Works Co. & Improvement Co., William McCarthy, superintendent, has plans for increasing pipe-line facilities if city decided to install 50 fire hydrants.

WOODWORKING PLANTS

Ala., Dyas.—Shingles, etc.—Home Gardens Lumber & Shingle Co. incorporated by W. D. Olney, J. B. Lawrence, J. C. Pohlman and Frank S. Stone; will manufacture shingles; later install box and basket factory.

Ark., Imboden.—Furniture.—Brewer & Gore, Memphis, Tenn., contemplate establishing furniture factory.

Mo., Kansas City.—Boxes.—Kansas City Box Co. will erect factory to cost \$100,000.

Mo., St. Louis.—Carriages.—John C. Dix will build carriage factory; cost \$12,000.

N. C., Yadkinville.—Buggies.—Yadkinville Buggy Co. incorporated with \$25,000 capital stock by J. H. Dobbins, J. H. Mackie, J. L. Crater and W. G. Wooten.

Tenn., Chattanooga.—Wood Patterns.—Strickland Pattern Works, Barney Strickland, president, awarded contract to W. K. Brown, James Bldg., Chattanooga, to erect plant to replace burned plant; 36x80 feet; brick; cost \$3000; machinery purchased. (Recently noted under "Foundry and Machine Shops.")

Tenn., Jackson.—Handles.—B. Jordan, Monticello, Ga., contemplates establishing handle factory; location not determined. (Recently noted.)

Tenn., Loudon.—Chairs.—Loudon Chair Manufacturing Co., C. H. Bacon, president, is having plans prepared by Baumann Bros., Knoxville, Tenn., for chair factory building; two stories; 70x100 feet.

Tex., El Paso.—Boxes, Sash, Doors, etc.—El Paso Milling Co. has building permits for two structures lately mentioned, to cost \$150,000; planing mill 45 feet high, 400x500 feet, and sash, door, etc., factory 45 feet high, 300x400 feet; contractors, Jolly & Ware of El Paso; engineer in charge, Pearson Engineering Corporation, 25 Broad St., New York. (Recently reported.)

Tex., Temple.—Sashes, Doors.—Peters, Zebra & Zeech, Waco, Tex., purchased City Planing Mill; will enlarge and install machinery for manufacture of sashes, doors, window screens and general woodwork.

Tex., Timpson.—Handles.—Timpson Handle Co. will rebuild plant recently reported burned; no building proposals needed; capacity of plant 300 handles daily.

W. Va., Elkins.—Boxes.—J. G. McIlwraith, Elwood, Ind., H. P. McIlwraith, New Castle, Pa., and William Munroe, Muskegon, Mich., will establish box factory.

BURNED

Ala., Toinette.—Residence of H. W. Cochran of Cochran Lumber Co.; loss \$8000.

D. C., Washington.—J. G. McCrory & Co.'s 10-cent store at 414-16 7th St. N. W., loss \$60,000; main office New York; B. Howard Richards, 308 Equitable Bldg., Baltimore, Md., representative east of Pittsburgh, Pa.

Ga., Savannah.—Savannah Cooperage Co.'s plant on Savannah River; loss \$20,000 to \$25,000.

Ky., Bowling Green.—News Publishing Co.'s printing plant damaged; loss \$5000.

Ky., Central City.—C. W. Wells' restaurant; loss \$7000.

Ky., Catlettsburg.—James M. Rice's residence.

Ky., Franklin.—James N. La Rue's residence; loss \$6000.

Ky., Glasgow.—Farmers' Hardware & Grocery Co.'s building; loss \$10,000.

BUILDING NEWS

BUILDINGS PROPOSED

APARTMENT-HOUSES

Ala., Montgomery.—R. L. Penick and associates will erect apartment-house at Caroline and Mildred Sts.; 60 rooms; veneered brick.

Ky., Paducah.—I. D. Wilcox is having plans prepared by W. L. Brainerd for apartment-house at 6th St. and Kentucky Ave.; two stories; seven apartments; cost \$7000.

La., New Orleans.—Gordon S. Levy, architect, New Orleans, prepared plans for apartment-house on St. Charles Ave.; seven stories; 120x150 feet; reinforced concrete; hardwood floors; tile floors in corridors except on first floor, which will be of marble wainscoting; 28 apartments; electric dumb-waiter system; each apartment equipped with refrigerator cooled by coils hidden beneath floor and connected with refrigerating plant in basement; glass-covered court; vacuum cleaning system; two electric pas-

La., Shreveport.—Harry Brewster's residence; loss \$4000.

Md., Annapolis.—Laundry and power-house at Carvel Hall, loss \$3000; W. J. Seeley, assistant manager.

Md., Crisfield.—R. Bird's store on Main St. Md., Ellicott City.—William M. Manly's barn, stable and cornhouse; loss about \$15,000.

Miss., Bolton.—Murrell Hotel, owned by F. N. Melon.

Mo., Hannibal.—Levering Hospital; loss \$40,000.

Mo., Mercer.—Building owned by H. J. Alley of Princeton, Mo., and Mrs. G. C. Wallingford of Kansas City, Mo.; loss \$7000.

N. C., Lexington.—L. C. Norris' residence.

N. C., Lenoir.—Lenoir Hotel; loss on building, owned by J. S. Lancaster, \$5000.

N. C., Winston-Salem.—Rosenbacher & Bro.'s store at 4th and Trade Sts.; loss \$80,000.

Tenn., Morristown.—Morristown Steam Laundry; loss \$2500; S. D. Williams is manager.

Tenn., Red Bolling Springs.—Lower Hotel; loss about \$12,000.

Tenn., Ruskin.—Ruskin Cave College boys' dormitory; loss \$3000.

Tex., Abilene.—Minter Dry Goods Co.'s store; loss \$20,000; buildings owned by J. M. Radford and J. A. Thomas.

Tex., Bonham.—Sanders Drug Store; loss about \$3000.

Tex., Florence.—Florence Mercantile Co.'s store; loss \$40,000.

Tex., Goodlet.—Saratoga Hotel; loss \$6000.

Tex., Georgetown.—W. A. Moore's rooming-house; loss \$4000.

Tex., Hillsboro.—Missouri, Kansas & Texas Railway's roundhouse; loss \$3000 to \$5000; A. M. Acheson, chief engineer, Dallas, Tex.

Tex., Hooks.—George Lawrence's cotton gin; loss \$4000.

Tex., Houston.—Katter Fruit Co.'s building, loss \$4000; J. Resan's building, loss \$5000; J. W. Bailey's store, loss \$5000; Jaiser & Jameson's store, loss \$6000; Pangburn Drug Co.'s store, loss \$9000; Katter Drug Co.'s store, loss \$10,000; Joe Goldstein's store, loss \$8000; Sandlain Drug Co.'s store, loss \$5000; Humble State Bank, loss \$10,000; J. W. Hall's store, loss \$11,000; I. Grossman's store, loss \$10,000; J. A. Jonas' store, loss \$10,000.

Tex., Lancaster.—Speer's school main building and dormitory, owned by R. P. Henry; loss \$10,000.

Tex., San Antonio.—Guessaz & Ferlet Company's printing plant at 310 Navarro St. damaged; building owned by F. Groos & Co.; loss \$25,000 to \$30,000.

Tex., Spur.—Building owned by B. F. Craig and occupied by Central Market and Walkers' Bakery; E. J. Cowan's store, and Red Front Drug Co.'s store; loss \$6550.

Va., Broadway.—St. James Hotel, owned by Earl Hyde.

W. Va., Parkersburg.—Mercer Hardware & Furniture Co.'s store; loss \$20,000.

COLLAPSED

S. C., Columbia.—Steel frame for State fair building on State fair grounds, owned jointly by city and South Carolina Agricultural and Mechanical Society; loss about \$25,000.

senger and four electric dumbwaiters; bids opened February 29; cost about \$100,000; owner's name withheld.

Md., Baltimore.—Morris Taylor, 1505 E. Baltimore St., will erect apartment-house at 5th and 7th Sts. (See "Stores.")

Mo., St. Louis.—Samota & Cunard Realty & Building Co. will erect apartment-house at Academy and Wells Aves.; 100x196 feet; J. Blair Riddington, architect; Samuel J. Coultes, president of Cunard company, will supervise construction.

Mo., St. Louis.—F. Wyland Realty Building Co. will erect two apartment-houses at 5788 and 5798 Berlin Ave.; cost \$12,500 and \$15,000.

N. C., Reidsville.—Dr. J. W. McGehee contemplates erection of apartment-house; five and six-room apartments.

S. C., Charleston.—J. F. Condon & Son, 423-37 King St., will erect four apartments.

Tenn., Knoxville.—French & Roberts are having plans prepared to remodel building for bank, offices and apartments. (See "Bank and Office.")

Tex., Houston.—James R. Kingsley will erect store and apartment building. (See "Stores.")

Va., Richmond.—C. E. Sprengle will erect three two-story brick tenement-houses; cost \$20,000.

ASSOCIATION AND FRATERNAL

Fla., Jacksonville.—Jacksonville Lodge, No. 231, Benevolent Protective Order of Elks, contemplates erecting lodge buildings.

N. C., Raleigh.—Young Men's Christian Association, E. M. Hall, secretary, will open bids March 12 to erect association building; 70x126 feet; ordinary and mill construction; low-pressure steam heat; electric wiring; cost \$50,000; plans by Shattuck & Hussey and Frank K. Thomson, associate architects, Masonic Temple Bldg., Raleigh. (Carey J. Hunter, chairman of building committee, recently noted to receive bids until March 2.)

Tex., Plainview.—Ancient Free and Accepted Masons plan to erect temple; two stories; 50x120 feet; lower floor for stores; upper floor for lodge; cost \$20,000.

W. Va., Bluefield.—Masonic Trust Association has plans for Masonic temple; 51x91 feet; steel, concrete and brick; four stories; steel arch roof; cost \$75,000 to \$100,000. (Previously noted.)

BANK AND OFFICE

Ala., Marion.—Marion Central Bank will erect bank building.

Fla., Tampa.—Elmer Webb and Frank Bruen will erect store and office building. (See "Stores.")

Ga., Atlanta.—Bankers' Financing Co. commissioned J. R. MacEachron, 332 Candler Bldg., Atlanta, to prepare plans for bank building on Decatur and Piedmont Aves.; two stories and mezzanine floor; 22x36 feet; pressed brick; terra-cotta trimmings; steam heat.

Ga., Macon.—B. T. Adams will erect four store and office buildings. (See "Stores.")

Mo., St. Louis.—Bremen Bank, 3600 N. Broadway, is having plans prepared by Clymer & Drischler, St. Louis, to enlarge and improve building, utilizing adjoining structure; main room 45x60 feet; cost \$25,000.

N. C., Rutherfordton.—Commercial Bank has site at Main and 3d Sts. and will erect bank.

S. C., Columbia.—Lutheran Board of Publication, Rev. W. H. Greever, manager, will receive bids until February 27 to erect store and office building. (See "Miscellaneous Enterprises.")

Tenn., Knoxville.—French & Roberts are having plans prepared by R. F. Graf & Sons, Knoxville, to remodel building for bank, office and apartments; cost \$15,000.

Tenn., Nashville.—American National Bank, N. P. Lesueur, cashier, has not determined plans for bank building recently noted.

Tex., El Paso.—Two Republics Life Insurance Co. will erect two-story brick addition.

Tex., Galveston.—American National Insurance Co. will erect commercial and office building.

Tex., Rockdale.—J. F. Coffield will rebuild office and store building recently reported burned. (See "Stores.")

Tex., Rockdale.—J. W. Perry will expend \$4500 to erect office and store building recently noted. (See "Stores.")

Va., Richmond.—W. A. Chesterman has plans for office and store building; cost \$15,000. (See "Stores.")

CHURCHES

Ala., Anniston.—First Methodist Church, Rev. George Stoves, pastor, plans to erect annex to edifice, 60x80 feet; cost \$7000.

Fla., Eustis.—Trustees First Presbyterian Church will expend \$15,000 to erect edifice recently noted; 90x100 feet; ordinary construction; hot-air furnace; electric lighting; plans by Charles Henry, Eustis; day labor. (See "Machinery Wanted.")

Ga., Columbus.—Rose Hill Presbyterian Church has plans by T. W. Smith, Columbus, for edifice; 40x50 feet; pebble-dash; heating and lighting undetermined; cost \$4000. (Recently noted.)

Ky., Somerset.—Christian Church will erect edifice on S. Main St.; cost \$15,000.

La., Hammond.—Holy Ghost Roman Catholic Church will erect edifice. Address The Pastor, Holy Ghost Roman Catholic Church.

Md., Baltimore.—Walbrook Methodist Church, Rev. John R. Edwards, pastor, will

erect edifice at North Ave. and Windsor Mills Rd.; Port Deposit granite; 60x100 feet; main auditorium to seat about 750; Sunday-school to seat 600; cost \$50,000; J. Arthur Nelson, vice-president of Fidelity & Deposit Co., Charles and Lexington Sts., chairman of building committee.

Miss., Vicksburg.—Methodist Episcopal Church South, Rev. W. H. Saunders, pastor, will let contract latter part of May to erect edifice recently noted; two stories; 50x50 feet; ordinary construction; furnace; electric lighting; cost \$9000; plans by W. A. Staunton. (See "Machinery Wanted.")

N. C., Durham.—First Presbyterian Church will erect Sunday-school room; plans not determined; E. B. Leyburn, pastor.

S. C., Columbia.—St. Luke's Episcopal Church will receive bids until March 7 through W. E. Lewis, chairman of building committee, to erect frame edifice; certified check for \$50; plans and specifications at office of J. H. Sams, architect, Room 18 Carolina National Bank Bldg., Columbia. (Previously noted.)

S. C., Orangeburg.—Christian congregation will erect edifice; cost \$7000. Address The Pastor, Christian Church.

Tenn., Jackson.—Methodist Church has plans by R. A. Heavener, Jackson, for edifice; steam heat; gas and electric lighting; cost \$60,000.

Tenn., Jellico.—First Baptist Church is having plans prepared by R. F. Graf & Sons, Knoxville, Tenn., for edifice; brick; marble trimmings; cost \$20,000.

Tenn., Memphis.—Sacred Heart Church, Rev. Father Mahoney, pastor, will erect edifice at Jefferson Ave. and Cleveland St.; cost \$20,000.

Tex., Abilene.—First Methodist Church, Rev. W. A. Hall, pastor, will soon begin construction of proposed edifice; auditorium 90x75 feet; two galleries 20 feet wide; 16 classrooms; total seating capacity, 1200 to 1500.

Tex., Cleburne.—Field Street Baptist Church has plans and specifications for proposed edifice at Wardville and Fields Sts.; frame; B. Jay Jackson is interested.

Tex., Dallas.—Methodist Board of Church Extension will erect edifice; Dr. J. M. Peterson, L. Blaylock and A. C. Carson, committee.

Tex., Palestine.—Avenue A Baptist Church plans to erect edifice. Address The Pastor, Avenue A Baptist Church.

Tex., Pecos.—Southern Presbyterian congregation will erect edifice. Address The Pastor, Southern Presbyterian Church.

CITY AND COUNTY

Ga., Atlanta.—Pavilion and Bathhouse.—City has plans by City Architect Hayes, Atlanta, for 50-foot pavilion and extension to bathhouse, doubling capacity.

Ga., Gibson.—Jail.—Glascock county will vote on \$2000 bond issue to erect jail. Address County Commissioners. (See "Court-houses.")

Ga., Macon.—Dance Hall.—City appropriated \$3500 to erect dance hall in Central City Park similar to and to be connected with present structure. Address The Mayor.

Ky., Manchester.—Jail.—Clay County Jail Commissioners invite proposals to erect jail according to plans and specifications on file on and after February 20 in County Judge's office; plans will be furnished to bidders leaving certified check; bids, received until noon April 1, should be marked "Proposals for new jail," and addressed to T. J. Rawlings, chairman of commission; certified check for \$1000; usual rights reserved.

Mo., St. Louis.—Hospital.—H. M. Edmunds states that hospital department contemplates erecting no building at present. (Recently noted as to erect tuberculosis hospital.)

N. C., Hendersonville.—City Hall.—City contemplates improving city hall. Address The Mayor.

Okla., Hobart.—City Hall.—City will open bids about April 15 to erect city hall; 70x90 feet; four stories; fireproof floor and stairs; vacuum steam heat; cost \$30,000; plans by W. A. Etherton, Stillwater, Okla. (Recently noted. See "Machinery Wanted.")

Okla., Hobart.—Fire Station, etc.—City will erect fire station, police court and jail building; cost \$9000; may contain central heating plant for city hall, library, etc. Address The Mayor.

Tenn., Chattanooga.—Jail.—Hamilton county rejected all bids to erect jail, and will readvertise for bids to include building proper and cell work, or both. Address County Commissioners. (Recently noted.)

Tex., Beaumont.—Jail.—City will receive

competitive plans and specifications through J. G. Sutton, City Secretary, until March 5 to remodel lower floor of city hall for jail and courtroom; cost not to exceed \$15,000, including plans and specifications and architect's fees; Emmett A. Fletcher, Mayor.

Tex., Corpus Christi.—City Hall and Fire Station.—City will expend \$55,000 for city hall and fire station; construction to begin by April 15. Address The Mayor.

Va., Richmond.—Market.—Council Committee on Markets opened bids to erect Main St. and Franklin St. buildings; Wise Granite Co., Wise, N. C., is lowest bidder at \$49,000 for former and John T. Wilson, Richmond, Va., is lowest bidder at \$21,406 for latter; plans by Carneal & Johnson, National Bank of Virginia Bldg., Richmond. (Recently noted.)

COURTHOUSES

Ga., Athens.—Clarke County Commissioners ordered election April 3 to vote on \$200,000 bond issue to erect courthouse. (Recently noted.)

Ga., Gibson.—Glascock county will vote on \$15,000 bond issue to erect courthouse and \$2000 to erect jail. Address County Commissioners.

Mo., Booneville.—Cooper county, J. T. Hays, Clerk, will open bids February 26 to erect courthouse; 90x100 feet; fireproof construction; low-pressure steam heat; conduit system of lighting; cost \$100,000; plans by Robert G. Kirsch, 307 Selmitar Bldg., St. Louis, Mo. (Recently noted to receive bids until February 20.)

Mo., Paris.—Monroe County Commissioners, T. A. Mager, clerk, will let contract February 28 to erect courthouse; fireproof construction; gravity steam heat; electric lighting; cost \$85,000; plans by Rose & Peterson, Barker Bldg., Kansas City, Mo. (Recently noted.)

DWELLINGS

Ala., Birmingham.—C. W. Mills will erect three two-story dwellings on South Euclid Ave. to cost \$9000 and four two-story dwellings at South Sixteenth Ave. between 12th and 13th Sts. to cost \$10,000.

Ala., Birmingham.—R. Bernstedt will open bids March 10 to erect dwelling; 40x40 feet; ordinary construction; steam heat; gas and electric lighting; cost \$15,000; plans by W. A. Rayfield & Co., Echols-Strong Bldg., Birmingham. Architects may be addressed.

Ala., Brewton.—O. F. Luttrell will erect dwelling.

D. C., Washington.—H. A. Kite, 1338 G St. N. W., has plans by O. E. Landvoigt, 1338 G St. N. W., Washington, for 15 dwellings; 15x40 feet; ordinary construction; cost \$2000 each; construction by owner.

Fla., Anna Maria.—G. W. Bean is having plans prepared for stone bungalow.

Ga., Atlanta.—Smith & Guest will erect dwelling at 249 McLendon St.; cost \$3500.

Ga., Atlanta.—Dillon-Morris Company, Atlanta National Bank Bldg., will erect at 137 Prado St. two-story frame dwelling; cost \$4000; at 182 and 170 St. Charles Ave. two one-story frame dwellings; cost \$3950 and \$3450, respectively; at 37 Westwood Ave. two-story dwelling; cost \$3750.

Ga., Atlanta.—T. L. Lewis, 24 Queen St., will erect dwelling at 293 E. 14th St.; two stories; frame; cost \$4000.

Ga., Atlanta.—F. C. Wilkerson, 816 Peachtree St., will expend \$5500 to erect two dwellings; one six rooms and one seven rooms; hot-air heat; electric lighting.

Ky., Louisville.—S. L. Dorsey will erect two frame dwellings at 509 E. Oak St.; cost \$3200.

Ky., Louisville.—W. L. Specht will erect dwelling; brick; cost \$3500.

Ky., Louisville.—H. C. Gruber will erect two-story brick dwelling at 2017 Baringer Ave.; cost \$3500.

Md., Baltimore.—Horatio L. Whitridge, Calvert Bldg., will, it is reported, erect dwelling at Rogers Station; frame and brick; two and one-half stories; plans by Wilson L. Smith, 801 Law Bldg.

Md., Baltimore.—J. Elliott Gilpin, 139 W. Lanvale St., will erect residence on University Parkway; is having plans prepared by Charles E. Cassell & Son, Law Bldg., Baltimore; dwelling will be 43x45 feet; two stories, basement and attic; steam heat; electric wiring; cost \$7000; date of opening bids not set.

Md., Baltimore.—John T. Donohue, 1808 Thames St., is having plans prepared by Charles C. Broring, 9 N. Potomac St., Baltimore, for 25 dwellings on east side of Decker Ave. between Flat St. and Foster Ave.; two stories; iron-spot brick; 12x43 feet; cost \$24,000.

Md., Chevy Chase.—George Dugdale is having plans prepared by George P. Hales, 300 Bond Bldg., Washington, D. C., for dwelling on Huntington St.; one and a half stories; frame; gas and electric lighting; hot-water heat.

Md., Chevy Chase.—Cooper Lightbown will expend \$6500 (not \$9500 as recently stated) to erect dwelling; plans by George P. Hales, 300 Bond Bldg., Washington, D. C.

Mo., Kansas City.—A. J. King will erect four brick-veneer dwellings at 3715-21 Paseo St. and 2531-33 Campbell St.; cost \$19,000.

Mo., St. Louis.—George L. Zimmerer will erect four one-story dwellings on Minnesota Ave.; cost \$8000.

Mo., St. Louis.—C. W. Hehman will erect store and dwelling. (See "Stores.")

Mo., St. Louis.—George K. Hoblitzelle, vice-president of Commonwealth Steel Co., will erect residence.

N. C., Greensboro.—Robert D. Douglas will erect residence on N. Park Drive; 33x48 feet, excluding porches and rear ell; frame; brick veneer; low-pressure steam heat; electric lighting; cost \$4500 to \$5000; plans by G. W. Armfield, Greensboro, N. C.; will probably open bids in about 60 days. (See "Machinery Wanted.")

N. C., Greensboro.—Frank Leak will erect residence on Elm St. near Hendrix St.

N. C., Greensboro.—C. D. Benbow, Jr., will erect residence on N. Park Drive.

N. C., Greensboro.—T. A. Armstrong will erect residence on W. Market St.; cost \$12,000.

N. C., High Point.—George T. Perry will open bids about May 1 to erect proposed dwelling; 12 rooms; electric lighting; cost \$10,000. (See "Machinery Wanted.")

N. C., Louisburg.—Thomas R. Wilder will erect dwelling; slate roof; hot-water heat; vacuum cleaner; electric lighting.

Okla., Tulsa.—I. F. Crow will erect residence; cost \$3000.

Okla., Tulsa.—J. S. Cosden will erect two-story frame residence; cost \$10,000.

S. C., Belton.—W. K. Stringer plans to erect residence.

S. C., Charleston.—J. T. Roddy will erect dwelling at 13 Rutledge Ave.; cost \$5000.

S. C., Rock Hill.—W. E. Stowe has plans by J. S. Starr, Rock Hill, for residence; two stories; eight rooms.

S. C., McConellsville.—S. H. Love has plans by J. S. Starr, Rock Hill, S. C., to remodel and erect addition to residence; colonial type; double porch.

Tenn., Greeneville.—Thomas D. Brabson, cashier of First National Bank of Greeneville, is having plans prepared by Baumann Bros., Knoxville, Tenn., for residence; veneered with buff brick; red tile roof; hardwood floors; tile bathroom, porch and kitchen floors; cost \$14,000.

Tenn., Knoxville.—Albert Baumann of Baumann Bros. will erect cottage at 30 N. Fourth Ave.; two stories; eight rooms; stucco finish; slate roof; brick porch.

Tenn., Memphis.—August Longinotti will erect residence at 395 Stonewall Pl.; cost \$7000.

Tenn., Nashville.—Mrs. U. A. McGomes will erect residence at Acklen Park; stucco; cost \$7500.

Tenn., Nashville.—G. E. Eubanks will erect residence; brick veneer; shingle roof; cost \$3000.

Tex., Dallas.—G. M. Easley will erect residence at 5210 Gaston Ave.; brick veneer; cost \$6000.

Tex., Dallas.—E. S. Barham will erect three cottages at 4433-37 Cole Ave. and 5330 Tremont St.; cost \$4500.

Tex., El Paso.—H. L. Stewart will erect dwelling; two stories; brick; cost \$4000.

Tex., Huntsville.—Arthur B. Mays, Box 32, will expend \$3000 to erect 34x57-foot one-story bungalow; ordinary construction. (Recently noted.)

Tex., Aokum.—A. N. Turner contemplates erection of two cottages.

Va., Norfolk.—John Ayres will erect store and residence; frame; cost \$3000.

Va., Norfolk.—David W. Godwin will erect two residences on 23th St.; frame; cost \$2000.

W. Va., Bluefield.—Vincent Paoletto has plans by Pedigo & Garry, Bluefield, for residence; cost \$10,000.

W. Va., Bluefield.—E. E. Carter will probably erect 10 dwellings.

W. Va., Wheeling.—Henry H. Beneke will not erect dwelling, as recently reported.

GOVERNMENT AND STATE

Ark., Paragould-Postoffice.—Treasury Department, James Knox Taylor, supervising architect, Washington, D. C., will receive bids until March 27 to erect one-story-and-basement building; 3600 square feet ground area; brick face; stone and terra-cotta trimmings; bids to include plumbing, gaspiping, heating equipment, electric conduit and wiring and interior lighting fixtures; plans and specifications at office of custodian of site at Paragould, and of supervising architect at Washington. (Recently noted.)

Fla., Tallahassee — Courthouse. — State Building Commission invites proposals for construction of Supreme Court building; 75x125 feet; three stories; reinforced concrete; exterior of brick and terra-cotta; steam heat; drawings and specifications at office of Governor, Tallahassee, Fla., and at office of P. Thornton Marye, architect, Candler Bldg., Atlanta, Ga.; copies of drawings and specifications may be procured upon application to architect, accompanied by a deposit of \$15; proposals, accompanied by certified check for \$1000, will be received by Governor at Tallahassee until 3 P. M. March 2; usual rights reserved. (Recently noted.)

S. C., Darlington-Postoffice.—Treasury Department, Office of the Supervising Architect. Proposals received in this office until 2 P. M. March 30, and then opened, for construction complete (including plumbing, gaspiping, heating apparatus, electric conduits and wiring and lighting fixtures) of United States postoffice at Darlington; one story and basement; ground area about 4600 square feet; non-fireproof construction; stone facing; tin roof; drawings and specifications obtained from custodian of site at Darlington, S. C., or at this office at discretion of Supervising Architect James Knox Taylor.

Va., Fort Monroe-Hospital.—R. B. McBride, constructing quartermaster, opened bids to erect addition to general hospital; lowest bidders are as follows: For general construction, James H. Brinson, at \$24,660; for plumbing, Charles T. Taylor, at \$2150; for electric wiring and rewiring old structure, Samuel J. Watson, Jr., at \$411.50 and \$38, respectively; all of Hampton, Va. (Recently noted.)

HOTELS

Ala., Birmingham.—Roden Hotel Co., Eugene Fla. president, will have plans prepared by William C. Weston, Birmingham, for hotel; 12 stories; steel construction; about 350 rooms; 150x140 feet; cost \$1,000,000. (Recently noted.)

Ga., Atlanta.—Imperial Hotel Co. will expend about \$45,000 for improvements to hotel, including remodeling front, providing 25 additional rooms, etc.

Ga., Macon.—Leon S. Duer has plans by Hents & Reid, Macon, for hotel and six stores; 67x138 feet; mill construction; cost \$50,000; heating plant to cost \$3000; cost of elevator \$2500; day labor. (Recently noted.)

Ky., Louisville.—Clay-Lewis Hotel Co., 644 S. 10th St., has plans by McAllister Real Estate Co. for hotel; 79x120 feet; fireproof construction; steel, concrete and brick; 300 rooms; convention hall on eighth floor; roof garden; hot-water heat; electric lighting; will open bids about April 15. (Recently noted.)

Md., Baltimore.—Hotel Albion, Cathedral and Richmond Sts., plans to erect addition.

N. C., Montreat.—Mountain Retreat Association, Dr. R. C. Anderson, president, plans campaign to raise \$100,000 for improvements to include erection of 40 additional rooms to Alba Hotel, additional baths, etc., erection of auditorium to seat 3000, home for aged ministers, electric-light system to be developed from water-power already available, grading roads, landscape gardening, etc.; hotel addition, 40x160 feet; ordinary construction; frame; cost \$10,000; will let contract within 10 days. (See "Machinery Wanted.") Previously noted.)

N. C., Wilmington.—Carolina Hotel Co. will be organized by Geo. O. Gaylord, W. B. Cooper and Thos. E. Cooper and others; will remodel building at Front and Grace Sts. and erect additional stories for hotel.

Tenn., Middlesboro.—New South Brewing Co. is having plans prepared by Baumann Bros., Knoxville, Tenn., for proposed hotel; three stories; brick.

Tex., Beeville.—Young Men's Progressive League, G. M. Boyd, secretary, is interested in erecting hotel; three or four stories; cost \$50,000; plans not determined. (Recently noted as organizing company to erect hotel.)

Tex., Dallas.—Oriental Hotel Association, Otto Herold, vice-president and general manager, will, it is reported, expend about \$40,000 to improve Oriental Hotel, including several private dining-rooms, etc.

Tex., Victoria.—Ben H. Matthews, proprietor of Denver Hotel, is having plans prepared for hotel to replace present structure; three stories and basement; gray pressed brick; cost \$30,000.

MISCELLANEOUS

Md., Baltimore-Clubhouse.—Maryland Canoe Club, E. G. Hooper, secretary-treasurer, third floor B. & O. Bldg., Charles and Baltimore Sts., plans to erect clubhouse to accommodate 200 to 300 canoes.

Miss., Natchez-Fair.—Natchez Chamber of Commerce plans to improve Auburn Park, erect permanent buildings, swimming pool, boat lake, trotting track, etc.

Mo., St. Louis-Hospital.—St. Louis Children's Free Hospital Association purchased site on Kingshighway and is having plans prepared by Mauran, Russell & Crowell, St. Louis, for proposed hospital building.

N. C., Montreat-Auditorium and Ministers' Home.—Mountain Retreat Association, Dr. R. C. Anderson, president, plans to erect auditorium to seat 3000 and home for aged ministers. (See "Hotels.")

S. C., Greenville-Rescue Home.—Rescue Home, Thomas F. Parker, chairman of board of managers, Rutherford St., plans to erect \$15,000 building.

S. C., Greenville-Hospital.—South Carolina Children's Home Society, William B. Streeter, State superintendent, approved preliminary plans for proposed orthopedic hospital; two stories; main department and two wings.

Tenn., Chattanooga-Sanitarium.—Dr. J. McChesney Hogshead will erect sanitarium.

Tex., Dallas-Chamber of Commerce.—Chamber of Commerce, T. E. Jackson, acting chairman of building committee, contemplates erecting chamber of commerce building; 10 to 12 stories.

RAILWAY STATIONS

Ark., Batesville.—St. Louis, Iron Mountain & Southern Railroad, E. F. Mitchell, chief engineer, St. Louis, Mo., is reported as to enlarge depot; plans later to erect passenger depot and use present structure as freight station.

Ga., Milledgeville.—Georgia Railroad Co., W. M. Robinson, roadmaster, Augusta, Ga., will erect depot; plans not determined.

Mo., St. Louis.—St. Louis Southwestern Railway, F. H. Britton, general manager, will erect five-story freighthouse; 750 feet long. (See "Railway Shops, Terminals, Roundhouses, etc.")

Tex., Florence.—Bartlett Western Railway, J. W. Jackson, president, Bartlett, Tex., will erect depot.

Tex., Cleburne.—F. Merritt, chief engineer Gulf, Colorado & Santa Fe Railway Co., Galveston, Tex., states erection of passenger station and yard improvements is very indefinite for remainder of year.

Tex., El Paso.—Texas & Pacific Railroad Co., B. S. Wathen, chief engineer, is reported as to remodel Thorne warehouse for freight depot to be used until completion of new structure. (Recently noted.)

W. Va., Fairmont.—Baltimore & Ohio Railroad, F. L. Stuart, chief engineer, Charles and Baltimore Sts., Baltimore, will, it is reported, begin erection of proposed freight station about April 1.

SCHOOLS

Ala., Albertville.—Seventh District Agricultural School has plans by D. O. Whilden, Birmingham, Ala., for proposed school to replace burned structure; three stories; brick; 17 recitation-rooms, besides gymnasium and auditorium to seat 500 people.

Ala., Montgomery.—Woman's College is having plans prepared by Okel & Cooper, Vandiver Bldg., Montgomery, Ala., for dormitory; three stories and basement; 59x160 feet; brick walls; stone trimmings; slate roof; steam heat; electric lighting; plans and specifications may be had at office of architects after March 6; bids opened March 15.

Ala., Seima.—City will vote March 25 on \$35,000 bond issue to erect school. Address The Mayor.

D. C., Washington.—Immacula Seminary will erect addition to school on Mount Marian, Wisconsin Ave. N. W.; 250x300 feet; white stone; hardwood finish; gas and electric lighting; heating plant; basement will contain cold-storage plant; chapel, library, drawing-rooms, etc., on main floor; upper stories for sleeping apartments and sun parlor; private bath in each room.

Fla., Elkton.—Bids received by Board of Public Instruction, W. S. M. Pinkham, super-

intendent, St. Augustine, Fla., by February 20 to erect school; two stories. (Recently noted.)

Ga., Senoia.—City will erect school building; six classrooms, music and expression rooms and auditorium; furnace; electric lighting; plans not made; L. L. Hutchinson may be addressed. (Recently noted to vote March 26 on \$10,000 bond issue to erect school.)

Ky., Louisville.—Bids received until February 21 by Board of Education to erect Audubon Open-Air School. (See "Machinery Wanted.")

La., Natchitoches.—Building Committee, State Normal School, Edgar Levy, chairman, will receive plans and specifications until March 12 to erect normal school. (Lately noted.)

Md., Betterton.—Kent County School Board, Chestertown, Md., plans to erect \$6000 school. (See Md., Chestertown.)

Md., Chestertown.—Kent County School Board plans \$48,000 bond issue to erect \$15,000 primary school at Chestertown, \$12,000 high school at Millington, Md., \$6000 school at Betterton, Md., and \$15,000 high school at Rock Hall, Md.

Md., Millington.—Kent County School Board, Chestertown, Md., plans to erect \$12,000 high school. (See Md., Chestertown.)

Mo., Carthage.—School Board, J. F. Harrison, president, will erect school in South Carthage for Fourth and Fifth wards.

Md., Rock Hall.—Kent County School Board, Chestertown, Md., plans to erect \$15,000 high school. (See Md., Chestertown.)

Miss., Jackson.—School trustees will award contract February 26 to erect Bailey Avenue school; two stories and basement; buff brick; steam heat; cost about \$35,000.

N. C., Charlotte.—Building and grounds committee accepted bids for schools and will recommend following to School Commissioners for acceptance: To Blythe & Isenhour, Charlotte, at \$49,000, for Ward 1, Ward 4 and Belmont-North Charlotte school, and at \$8325 for Seversville-Wesley Heights building, and to J. E. Solomon, Charlotte, at \$9240 to American Machine Co. for heating systems at \$6575. (Recently noted.)

Okla., Enid.—Board of Education will let contract in the spring to erect ward school in Sawyer addition; 68x84 feet; fireproof construction; direct and indirect steam heat; cost \$25,000; plans by R. M. Shaw, Enid. (Recently noted.)

Tenn., Adams.—City voted bond issue to erect school. Address The Mayor.

Tenn., East Lake.—School Board has plans by Huntington & Sears, Chattanooga, Tenn., for proposed \$25,000 school.

Tenn., Jackson.—Trustees of Union University, R. A. Kimbrough, president, has engaged R. H. Hunt, Chattanooga, Tenn., to prepare plans for administration building to cost \$30,000. (Recently noted.)

Tenn., Knoxville.—Brookside Kindergarten Association, Mrs. G. W. Pickle, president, West Clinch Ave., plans to erect kindergarten building.

Tex., Carlsbad.—Town will vote on bond issue to erect \$10,000 school. Address Town Clerk.

Tex., Dallas.—Board of Education will petition city to hold election in April to vote on \$600,000 school bond issue, to be used as follows: High school in South Dallas, \$150,000; lot for high school, \$70,000; lot in South Dallas, \$8000; building in Cotton Mills district, eight rooms, \$33,000; four-room addition to Cedar Lawn school, \$15,000; John Henry Brown school, eight-room addition, \$30,000; eight-room school on Reiger Ave., East Dallas, \$33,000; four-room addition to Fannin school, \$18,000; four-room addition to school in Deere Park Addition, \$9000; four-room addition to school provided for Fairland, \$9000; four-room addition to Sam Houston school, \$10,000; four-room addition to Hogg school, \$9000; eight-room school for West Oak Cliff, \$33,000; lot in southwest Oak Cliff, \$8000; remodeling Oak Cliff high school, \$15,000; fire escapes for all non-fireproof buildings now built, \$20,000; steam heating for buildings now using stoves, \$30,000; negro school buildings, \$70,000.

Tex., Port Arthur.—Independent School District will vote March 12 on \$35,000 bond issue to erect school building. Address School Commissioners.

Tex., El Paso.—School Board will advertise for bids to erect East El Paso school with skeleton for second story and two-story six-room additions to east and west ends of High School, for which plans were prepared by Trost & Trost, El Paso; cost \$24,000; will also install heating plant in High School to cost \$3000.

Tex., Helbig, P. O. Rosedale.—Helbig School District plans election to vote on \$25,000 bond issue to erect school; W. H. Farmer, county superintendent, Beaumont, Tex.

Tex., Houston.—City rejected all bids to erect Rusk school; will have plans modified and receive new bids; H. B. Rice, Mayor. (Recently noted.)

Tex., Pearland.—Pearland School District No. 1 will vote on \$12,000 bond issue to erect high school. Address District School Trustees.

Tex., San Antonio.—Alamo Heights School District No. 48 will issue \$25,000 of bonds for school improvements. Address Bexar County Commissioners.

Tex., Tuscola.—Tuscola Independent School District Trustees will erect \$10,000 brick school.

Tex., Water Valley.—Town will vote on bond issue to erect \$10,000 school. Address Town Clerk.

Tex., Waxahachie.—Howard School District No. 1 of Ellis county will vote March 4 on \$325 bond issue to erect school. Address County Commissioners.

Va., Bedford City.—Board of School Commissioners will erect school.

Va., Hillsville.—School trustees of Laurel Fork, Pine Creek and Hillsville districts will erect high school.

Va., Ivanhoe.—Lead Mine District School Board will receive bids until March 15 to erect two-story brick school; plans and specifications at Bank of Ivanhoe, Ivanhoe; Clarence B. Kearfott, architect, Bristol, Va.; separate bids will also be received for general contract and heating plant. (Previously noted.)

W. Va., Princeton.—East River District Board of Education of Mercer County will receive bids until March 20 to erect high school; certified check for 1 per cent. amount of bid; plans and specifications at office of A. F. Wysong, architect, Princeton.

STORES

Ala., Birmingham.—W. G. Oliver will erect eight one-story frame buildings at North 10th Al. and 22d St. and four at North Eighth Ave., between 9th and 10th Sts.; cost \$4800.

Ala., Brewton.—Luttrell Hardware Co. will erect three-story brick store building.

Ala., Montgomery.—Hobbs Bros. are having plans prepared by Frederick Ausfeld, 1024 Bell Bldg., Montgomery, for store building recently reported burned; four stories; cost \$22,000 to \$24,000; install sprinkler system. (See "Machinery Wanted.")

Ark., Little Rock.—Mrs. Florence Fulk will erect three-story building at 6th and Main Sts.; mill construction; automatic sprinkler system; automatic trap-doors for interior stairways; cost \$40,000.

Fla., Arcadia.—A. B. Williford will erect business building.

Ga., Atlanta.—Georgia Realty Co. will erect store on Stewart Ave.; cost \$3000.

Fla., Tampa.—Elmer Webb and Frank Bruen will erect store and office building; two stories; brick.

Ga., Atlanta.—J. R. Smith of Realty Company will receive bids to erect store and warehouse; 60x160 feet; four stories and basement; mill construction; concrete foundation; stone and terra-cotta trimmings; electric freight elevator; steel rolling doors; steam heat; cost \$40,000; plans by J. R. MacEachron, 932 Candler Bldg., Atlanta.

Ga., Atlanta.—M. C. Kiser Company will erect business building; cost about \$100,000.

Ga., Atlanta.—John Slivey & Co. will erect store building; six stories; cost about \$60,000.

Ga., Atlanta.—Blackstock, Hale & Cowan leased building at 59 and 52 Marietta St. and will expend several thousand dollars for improvements, to include new front, etc.

Ga., Columbus.—James A. Lewis will erect store on First Ave.; to be occupied by David Rothschild; 50x150 feet; brick; steam heated; elevator; cost \$15,000.

Ga., Macon.—B. T. Adams will erect four store and office buildings; brick; three or four stories; lower floor for stores; upper floors for offices.

Ga., Macon.—Leon S. Duer has plans for six stores and hotel; cost \$50,000. (See "Hotels.")

Ky., Louisville.—John P. Starks will erect mercantile building; six stories.

La., Hammond.—A. G. Jackson plans to erect business building; marble front.

Md., Baltimore.—Thomas M. Reese & Sons, 347 N. Charles St., are having plans prepared by Theodore Wells Pletsch, 1001 American Bldg., Baltimore, to erect store at Charles and Center Sts.

Md., Baltimore.—Lauer's Bros. are having plans prepared by Theodore Wells Pietsch, 1901 American Bldg., Baltimore, for addition to store on Gay St.

Md., Brooklyn.—H. C. Glantz, 1217 W. North Ave., Baltimore, Md., contemplates rebuilding business building. (Recently reported burned.)

Miss., Greenwood.—Damer Bros. will erect two-story brick mercantile building.

Miss., Greenwood.—W. T. Fountain contemplates erecting three-story brick department store.

Md., Baltimore.—Morris Taylor, 1505 E. Baltimore St., purchased building at 1503 E. Baltimore St., and will convert into store; also purchased property at 5 and 7 S. Caroline St., and will erect apartment-house.

Mo., St. Louis.—C. W. Hehman will erect two-story double store and dwelling at 1621-23-25 39th St. and 3905 McKee St.; cost \$12,000.

Mo., St. Louis.—Wiltonet Realty Co. will erect wholesale building at 1408-14 Washington Ave.; two stories; ornate stone front; brick construction; three stores on lower floor; cost \$25,000; plans by Ernest Preisler, 918 Pine St.; contract awarded to Julius H. Wise, Victoria Bldg.

N. C., Dunn.—George E. Pope will erect store building; two stories.

N. C., Rutherfordton.—C. L. Miller will erect store.

N. C., Reidsville.—J. H. Benton contemplates erection of store building.

N. C., Winston-Salem.—D. H. Starbuck will rebuild store reported burned; occupied by Rosenbacher Bros.

N. C., Wilmington.—J. H. Brunjes is having plans prepared by Grossmann-Mahler Architectural & Construction Co., 31 Carroll Bldg., Wilmington, for store building; 24x70 feet.

S. C., Charleston.—I. M. Monash will receive bids through D. C. Barbot, architect, 26 Broad St., Charleston, for three-story brick building at 131-33 Market St.; certified check for \$100, payable to architect, from whom plans and specifications may be had.

S. C., Charleston.—J. F. Condon & Son, 433-37 King St., are having plans prepared by D. C. Barbot, Charleston, for two-story brick addition and improvements to store.

S. C., Charleston.—E. M. Gansgray will erect building at 4 West St.; cost \$5000.

S. C., Columbia.—Lutheran Board of Publication, Rev. W. H. Greever, manager, will receive bids until February 27 for erection of store and office building. (See "Miscellaneous Enterprises.")

Tenn., Erwin.—L. H. Phetteplace, superintendent of C. C. & O. Railroad, will erect business building at Main and Union Sts.

Tenn., Memphis.—I. Samelson and E. Lowenstein will erect business building; two stories; brick; cost \$30,000.

Tex., Cuero.—William Wagner will open bids about March 1 to erect business building; 25x115 feet; brick; electric lighting; cost \$3500; plans by D. J. Hayes Company, Cuero. (Contract recently noted.)

Tex., Dallas.—Pinckney Burton will erect building at 1413 Patterson Ave.; two stories; brick; cost \$8425.

Tex., Dallas.—Southern School Book Depository will erect proposed building at 311-17-19 Preston St.; two stories; concrete; cost \$20,446.

Tex., Dallas.—L. A. Murff will erect building at 4931 Crutcher St.; brick veneer; cost \$5500.

Tex., Houston.—James R. Kingsley will erect business building; two stories; concrete; lower floor for two stores; upper floor for apartments.

Tex., Port Arthur.—W. E. Tyrell, Beaumont, Tex., will erect business building; three stories; brick; 50x140 feet; cost \$40,000.

Tex., Plainview.—Ancient Free and Accepted Masons plan to erect store and lodge building. (See "Association and Fraternal.")

Tex., Galveston.—American National Insurance Co. will erect office and commercial building.

Tex., Rockdale.—J. F. Coffield will rebuild store and office building; 30x125 feet; two stories; semi-fireproof construction; cost \$6000 to \$8000. (Recently reported burned.)

Tex., Rockdale.—J. W. Perry will expend \$4500 to erect store and office building; 75x30 feet; concrete walls; heaters; electric lighting; plans and construction by owner. (Recently noted.)

Va., Norfolk.—John Ayres will erect store and residence. (See "Dwellings.")

Va., Richmond.—W. A. Chesterman has plans by A. F. Hunt, Richmond, for store and office building; 50 feet 6 inches by 130

feet and 49x47 feet; ordinary construction; cost \$15,000; construction by owner. (Recently noted under "Warehouses.")

THEATERS

Ala., Birmingham.—Jake Weiss, Richmond, Va., is negotiating with Louis V. Clark to erect theater at Third Ave. and 18th St.

Md., Baltimore.—Julius Mintz, 514 Equitable Bldg., purchased for client site on Howard St., near Franklin St.; plans will be prepared by A. Lowther Forrest, Hoffman Bldg., Baltimore, for theater.

Tenn., Bristol.—H. McCullough of Roanoke, Va., and L. Moore of New York will have plans prepared by Thomas L. Brown, 615 First National Bank Bldg., Roanoke, to remodel building for vaudeville theater; 60x110 feet; fire retarding; cost \$38,000; sub-contracts. (See "Machinery Wanted.")

W. Va., Elm Grove.—Zanitz & Leinweber, Cleveland, O., will expend \$6000 to remodel nickelodeon and hall; 25x100 feet; tile, cement, steel and wood; stoves; electric lighting; architect not selected. Address John A. Zanitz, 557 E. 105th St., Cleveland, O. (Recently noted.)

WAREHOUSES

Fla., Orlando.—J. L. Guernsey will erect warehouse at S. Orange and Church Sts.; stone and brick.

Ga., Savannah.—Atlantic Coast Line Railroad, E. B. Pleasants, chief engineer, Wilmington, N. C., acquired control of United Hydraulic Cotton Press and will, it is reported, erect seven warehouses of 1000 bales capacity each; total cost about \$100,000; will also erect roofed platform extending from

press to river front for capacity of from 5000 to 6000 bales.

Mo., St. Louis.—Louisville Property Co. will expend \$4000 to repair burned warehouse at 1440 N. Broadway.

Mo., Kansas City.—Rotherberg & Schloss will erect warehouse at 922 Broadway; concrete; cost \$114,000.

Mo., St. Louis.—Bernet, Craft & Kauffman Milling Co. will erect warehouse, etc., to replace burned plant. (See "Flour, Feed and Meal Mills.")

N. C., Durham.—R. M. Jones of West Durham will erect tobacco warehouse.

N. C., Louisburg.—Thomas B. Wilder will erect cotton-storage house with elevator.

N. C., Reidsville.—William Young will erect warehouse; cost \$12,000 to \$15,000.

N. C., Reidsville.—Rockingham Farmers' Union Storage Warehouse Co. will erect storage warehouse; 96x94 feet.

Tenn., Cleveland.—Hardwick Stove Foundry Co. will erect two additional stories to warehouse; brick; cost \$7500.

Va., Norfolk.—Bonney & Dozier will erect storage warehouse; iron.

Va., Richmond.—American Terminal Warehouse Corporation will erect addition to warehouse at 417 N. 17th St.; two stories; brick; steel and concrete; cost \$4000.

Va., Richmond.—W. Fred Richards will erect warehouse at Belvidere and Main Sts.; seven stories; brick and concrete; 31x125 feet; cost \$35,000.

Va., Richmond.—G. G. Worsham and C. A. Zinke will erect four-story brick warehouse on Governor St.; cost \$6000.

BUILDING CONTRACTS AWARDED

APARTMENT-HOUSES

N. C., Hendersonville.—Dr. A. H. Morey awarded contract to J. H. Jordan, Hendersonville, to erect store, office and apartment building. (See "Stores.")

ASSOCIATION AND FRATERNAL

Tex., Denison.—Woodmen of the World awarded contract to Tibbetts & Hauge to erect lodge building; two stories; 50x120 feet; cost \$11,100. (Recently noted.)

BANK AND OFFICE

Ala., Brighton, P. O. Bessemer.—John Walre awarded contract to erect office and store building. (See "Stores.")

Ga., Atlanta.—Lowry National Bank awarded contract to Gude & Son, Grant Bldg., Atlanta, to remodel banking-room; cost \$40,000 to \$50,000; all contracts closed. (Recently noted.)

N. C., Hendersonville.—Dr. A. H. Morey awarded contract to J. H. Jordan, Hendersonville, to erect store, office and apartment building. (See "Stores.")

Tenn., Memphis.—R. Brinkley Snowden awarded contract to James Alexander & Co., Memphis, to erect office, store and theater building. (See "Theaters.")

CHURCHES

S. C., Charleston.—Cumberland Methodist Church, Rev. J. T. Peeler, pastor, will erect edifice at America and Hampstead Sts.; cost \$7500; awarded contract to C. Kanapaux & Co., Charleston.

Tex., Ballinger.—Episcopal Church awarded contract to Taylor & Claypool, Ballinger, to erect edifice; 44x58 feet; wood; electric lighting; cost \$3000; plans by Pampel & Kahn, Temple, Tex. (Recently noted.)

Tex., Bryan.—St. Andrew's Episcopal Church awarded contract to C. E. Jenkins, Bryan, to erect edifice; cost \$25,000.

CITY AND COUNTY

N. C., Charlotte.—Shops, Stables and Cottage.—City awarded contract at \$4796 to Rankin & Burns, Charlotte, to erect shops, stables, wagon shed and cottage for engineer. (See "Water-works.")

Va., Portsmouth.—Municipal Building.—City awarded contract at \$27,372 to R. H. Richardson & Son, Norfolk, to erect municipal building and at \$6981 to Art Metal Construction Co., Jamestown, N. Y., for metal furniture; plans by B. F. Smith, 817 14th St. N. W., Washington. (Recently noted.)

COURTHOUSES

Ark., Osceola.—Mississippi County Commissioners awarded contract at \$87,820 to Falls City Construction Co., Louisville, Ky., to

erect courthouse; plans by John Galsford, Memphis, Tenn. (Recently noted.)

DWELLINGS

Fla., West Tampa, Station Tampa.—P. Rey of Cuesta, Rey & Co. awarded contract to B. F. Walker, Tampa, to erect residence; cost \$14,000; plans by Fred J. James, West Tampa. (Recently mentioned.)

Ga., Atlanta.—Mrs. L. P. Thomas awarded contract to Phillips & Moody, 513 Empire Bldg., Atlanta, Ga., to erect dwelling; cost \$6500.

Ga., Atlanta.—J. M. George, 64 Nelson St., will erect two one-story dwellings at 643-47 Jackson St.; frame; cost \$3000 each.

Tex., Bay City.—G. R. Keller awarded contract to Mr. Large to erect residence; eight rooms; brick veneer.

Tex., Beeville.—W. R. Scogin awarded contract to erect residence on Corpus Christi St.; two stories; eight rooms.

Tex., Fort Worth.—J. C. Foster, 118 Cannon Ave., awarded contract to rebuild residence; eight rooms; ordinary construction; cost \$3200. (Recently noted.)

Tex., Yoakum.—W. P. Bourke awarded contract to C. M. Smith, Yoakum, to erect residence; two stories.

Va., Norfolk.—Bullock & Beazley awarded contract to Sawyer Bros., Norfolk, to erect residence on Westover Ave.; cost \$5000.

GOVERNMENT AND STATE

La., Franklin.—Postoffice.—Treasury Department, James Knox Taylor, supervising architect, Washington, D. C., awarded contract to P. D. Alpha, Franklin, for pile-driving for proposed \$50,000 postoffice.

HOTELS

Tenn., Memphis.—A. L. Hatch awarded contract at \$22,000 to Ozanne & Hinson, Memphis, to erect hotel; plans by Harker & Cairns, Memphis. (Recently noted.)

W. Va., Parkersburg.—Z. F. Evans has plans by and awarded contract to Wyatt & Vannoy to erect 40x100-foot hotel; fireproof construction; gas heat; gas and electric lighting; cost \$10,000. (Recently noted.)

SCHOOLS

La., New Orleans.—City awarded contract at \$61,500 to John Minot, New Orleans, to erect Live Oak School; two stories and basement; 14 rooms; buff brick; plans by E. A. Christy, New Orleans. (Recently noted.)

Miss., Greenwood.—City awarded contract at \$35,000 to C. M. Rubush, Meridian, to erect school, and at \$7194 to Sodemann Heat & Power Co., St. Louis, Mo., for plumbing, heating and wiring; plans by R. H. Hunt, Chattanooga, Tenn. (Previously noted.)

Tenn., Mt. Pleasant.—City will expend

\$7000 to erect addition to high-school building; 40x72 feet; two stories and basement; ordinary construction; hot-water heat; electric wiring; plans by Marr & Holman; contract recently noted awarded to H. B. Austin, Florence, Ala.; all material purchased.

Tex., Bryan.—Ursuline Sisters will expend \$22,000 to construct annex to Ursuline Convent; 46x110 feet; ordinary construction; steam heat; electric and acetylene lighting; contract recently noted awarded to C. E. Jenkins, Bryan; plans by Mr. Jenkins. (See "Machinery Wanted.")

Tex., Frankston.—District school trustees awarded contract to A. H. Miller, McKinney, Tex., to erect school; cost \$8000; plans by A. C. Watson, Austin, Tex. (Previously noted.)

STORES

Ala., Birmingham.—Mrs. Lucy T. Hudgins awarded contract to Peerless Lumber Co., Birmingham, Ala., for proposed alterations to store building; 150x140 feet; steam heat; electric lighting; cost \$5000; plans by William Leslie Welton, Empire Bldg., Birmingham.

Ala., Brighton, P. O. Bessemer.—John Walre will expend \$6500 to erect store and office building; 44x75 feet; two stories; ordinary construction; plans by T. J. Skinner, Brighton; contract recently noted awarded to Carrigan & Lynn Construction Co., Birmingham, Ala.

Miss., Greenwood.—Dalmer Bros. awarded contract at \$11,000 to H. L. Walden & Co. to erect two brick buildings.

N. C., Concord.—P. M. Morris Real Estate Co. will expend \$3000 to erect three store rooms; 60x67 feet; ordinary construction; contract recently noted awarded to R. A. Brown's Sons, Concord, who also prepared plans. (See "Machinery Wanted.")

N. C., Hendersonville.—F. V. Hunter awarded contract to J. H. Jordan, Hendersonville, to erect business building; plans by H. C. Meyer, Hendersonville. (Recently noted.)

N. C., Hendersonville.—Dr. A. H. Morey awarded contract to J. H. Jordan, Hendersonville, to erect store, office and apartment building; 40x110 feet; ordinary construction; steam heat; cost \$10,000; plans by H. C. Meyer, Hendersonville. (Recently noted.)

S. C., Charleston.—Benjamin McInnes awarded contract to Robert McCarrel, Charleston, to erect business building at 57 Queen St. (Recently noted.)

S. C., Rock Hill.—Pride Ratterree awarded contract to Moser & Bumgarner, Hickory, N. C., to erect proposed building; two stories; 99x83 feet; pressed brick; stone trimmings; plate-glass fronts; cost \$20,000; plans by J. S. Starr, Rock Hill.

Tenn., Memphis.—R. Brinkley Snowden awarded contract to James Alexander & Co., Memphis, to erect store, office and theater. (See "Theaters.")

Tex., Dallas.—Dr. C. M. Grisby awarded contract to Thomas Beggs to erect store on Elm St.; one story; cost \$6000.

Tex., Dallas.—T. F. Loughlin awarded contract to H. F. Carter to erect store at 217-23 Commerce St.; three stories; cost \$18,000; plans by Sanguinet, Staats & Overbeck, Dallas.

Tex., Houston.—Levy Bros. awarded contract to Fred A. Jones Building Co. (not Jesse H. Jones Construction Co., as recently stated), Houston and Dallas, Tex., and Birmingham, Ala., to erect 50x110-foot structure and make alterations to adjoining building; mill construction; cost of lighting plant \$6000; three elevators; cost of building, \$50,000; plans by Mauran, Russell & Crowell, St. Louis, Mo.

Tex., Taylor.—John Bohls awarded contract to Ernest Groba, Taylor, to erect store building; two stories; brick.

THEATERS

S. C., Columbia.—Richland Savings Bank & Trust Co. awarded contract at about \$12,000 to Richland Construction Co. to erect moving-picture theater to be occupied by Montgomery Amusement Co., George C. Warner, manager. (Lately noted.)

Tenn., Memphis.—R. Brinkley Snowden awarded contract to James Alexander & Co., Memphis, to erect theater, store and office building on S. Main St., exclusive of heating, wiring, cooling system, etc.; 61x48 feet; reinforced concrete; steam heat; cost \$75,000; plans by Harker & Cairns, Memphis. (Recently noted.)

Tex., Midland.—J. J. Westmoreland awarded contract to erect business building; brick.

WAREHOUSES

S. C. Greenville.—W. C. Cleveland awarded contract to Jordan-Munn Construction Co., Greenville, to erect warehouse; one story; brick.

W. Va., Fairmont.—Owen Bottle Works awarded contract to McClintock-Marshall Construction Co., Park Bldg., Pittsburgh, Pa., to erect warehouse; steel; 300x275 feet; cost \$100,000.

RAILROAD CONSTRUCTION

RAILWAYS

Ala., Birmingham.—Horace Baker, general manager of the Queen & Crescent Route, is reported saying that the company contemplates considerable second-track work this year to care for increased traffic. C. Dougherty is chief engineer at Cincinnati, O.

Ala., Eufaula.—President W. L. Wild of the Eufaula & Chattahoochee Valley Railroad Co., is quoted saying that contract will be let within a few days for the line for which the second survey is nearly done.

Ala., Birmingham.—The Illinois Central Railroad denies that it is surveying for a line from Haleyville to Birmingham. This contradicts a recent press report.

Ala., Union Springs.—President W. M. Blount of the Birmingham & Southeastern Railroad is inviting bids for the construction of a 20-mile extension, bids to be received at either 817 or 818 Bell Bldg., Mobile, Ala., or at his general offices at Union Springs, Ala.

Ark., Clifton.—The Anderson & Saline River Railroad Co. is reported to have decided to extend 16 miles to Pine Bluff and 9 miles to Leola. J. H. Allen is vice-president and general manager, and J. S. Bell chief engineer at Pine Bluff, Ark.

Ark., Truman.—The directors of the Cairo, Truman & Southern Railroad Co., recently chartered to build from Truman to Earle, Ark., 29 miles, capital \$100,000, are reported thus: F. S. Charlott, L. M. Preston, H. F. Nelson, E. P. Carr, John Snell, Frank Bixler and Alfred Carroll.

Ark., Pine Bluff.—The Pine Bluff & Southern Railroad Co. is chartered to build a line from Pine Bluff via Star City and Monticello to Hamburg, Ark., 73 miles. This will be practically a continuation of the Pine Bluff & Northern. It will make a line from Hamburg via Pine Bluff to Searcy, Ark., 130 miles; incorporators, W. J. Miller, H. N. Street, W. M. Kavanaugh and C. P. Harnwell.

Fla., Arcadia.—The Wauchula, Atlantic & Gulf Railroad, connecting the Charlotte Harbor & Northern and the Atlantic Coast Line, is reported completed at Wauchula for the Wauchula Manufacturing Co. and other industries.

Fla., Arcadia.—C. P. Murdock and Lloyd Carlton are reported to have taken a contract at Pearce for the rebuilding of part of the Charlotte Harbor & Northern Railroad.

Ga., Columbus.—The Central of Georgia Railway, it is reported, will relay with heavy rails about 30 miles of line between Columbus and Buena Vista. C. K. Lawrence is chief engineer at Savannah, Ga.

Ga., Savannah.—The Seaboard Air Line is reported preparing plans for enlarging its terminal facilities at Hutchinson Island. W. L. Seddon, Portsmouth, Va., is chief engineer.

Ky., Carrollton.—Capt. G. W. Anderson and others are reported obtaining subscriptions for the proposed Covington, Big Bone & Carrollton electric and steam railroad, which, besides the points named, will also reach Ghent and Warsaw.

Ky., Hopkinsville.—The Kentucky-Tennessee Traction Co., capital \$1,000,000, has obtained a Delaware charter; incorporators, M. C. Forbes, Nat. F. Dortch and T. J. McKey. Solds of Hopkinsville, Ky. Several months ago it was reported that this company would build from Hopkinsville via Pembroke and Trenton to Guthrie, Ky., about 25 miles, and it might extend to Clarksville, Tenn.; also that Charles Van Den Burgh was securing right of way. (See Manufacturers Record of October 19, 1911.)

Ky., Winchester.—Surveys are reported being pushed to locate route for a proposed railroad from Winchester via Irvine to a point east of Jackson, Ky., on the extension of the Lexington & Eastern Railway of the Louisville & Nashville system. The Board of Trade at Winchester may be able to give information.

La., New Iberia.—The Frisco, it is reported, announces completion of extension from New Iberia to Jeanerette, La., 11 miles.

La., Pine Grove.—The New Orleans, Natalbany & Natchez Railroad is reported to have completed its extension from Pine Grove to Orangeville, six miles.

Miss., Jackson.—The Frisco system, which is interested largely in the New Orleans,

Mobile & Chicago Railroad, is reported surveying for a line from Union to Jackson, Miss., about 65 miles, to connect with the New Orleans Great Northern Railroad. F. G. Jonah, St. Louis, Mo., is chief engineer of construction.

Miss., Chunky.—The Tallahatta Lumber Co. of Chunky, it is reported, will extend its railroad eight miles northward.

Mo., Jefferson City.—Surveys are reported made for the proposed Oklahoma & Golden City Railroad from Jefferson City, Mo., to Fairview, Okla., 335 miles; also that work will soon be started by William Love of Lafayette, Ind. Others mentioned as interested are C. E. Hagerty of New York; A. S. Vaughn of Bolivar, Mo.; M. H. Cooper of Pittsburgh, Pa.; D. E. Ketcham of Golden City, Mo., and E. C. Griesel of Muskogee, Okla.

Mo., Jefferson City.—The Rock Island denies the press report that it would begin construction in the spring on a line from Allerton, Iowa, to either Henley or Meta, Mo., near Jefferson City.

Mo., Sibley.—The Santa Fe system, it is reported, will construct second track between Floyd and Sibley to cost about \$750,000. C. A. Morse is chief engineer at Topeka, Kans.

Mo., St. Louis.—The Wabash Railroad, says a report, will build about 50 miles of second track in Missouri, thus: Birmingham to Excelsior Springs Junction, 14 miles; Salisbury to Brunswick, 18 miles; Huntsville to Moberly, 6 miles; Moberly to Clark, 11.3 miles. A. O. Cunningham, St. Louis, is chief engineer.

Mo., St. Louis.—J. Charles Mueller, contractor and builder, 3500 Hebert St., St. Louis, is reported obtaining rights of way for a projected system of interurban railways 82 miles long in St. Louis county. Main line runs from Baden to the Missouri River, to Fort Bellefontaine, Musick's Ferry and St. Charles, 31 miles. There will be three branches, one from Baden to Spanish Lake and Fort Bellefontaine, 16 miles; another from Baden to Black Jack and the quarries of the St. Louis Portland Cement Works at the river, and the third from the intersection of New and Old Hall's Ferry Roads to Cross Keys, Florissant and Musick's Ferry, 19½ miles. A. F. W. Luehrmann, Richard Weissenborn, John C. Greulich and E. F. Nolte, who, with Mr. Mueller, are directors of the John C. Greulich Realty & Investment Co., are also said to be concerned.

Mo., St. Louis.—The St. Louis Southwest Railway has sold \$7,500,000 out of a total authorized new issue of \$100,000,000 of 5 per cent. bonds, the proceeds to be used in large part for terminals at St. Louis, Gray's Point and Fort Worth, as well as for betterments and extensions planned. C. D. Purdon, Tyler, Tex., is chief engineer.

N. C., Beaufort.—An official of the Norfolk Southern Railroad advises that no plans have been made to extend from Beaufort to Cape Lookout. This refers to recent press reports.

N. C., Burlington.—The Piedmont Railway & Electric Co. is reported surveying for an extension from Haw River via Chapel Hill to Durham, N. C., about 30 miles. J. W. Murray of Burlington is president.

N. C., Boone.—The Yadkin River Railroad Co. is chartered to build a line from Boone eastward through Watauga and Wilkes counties to North Wilkesboro, N. C., 45 miles; authorized capital \$25,000; directors, C. H. Cowles of Wilkesboro, N. C.; W. J. and G. M. Grandin of Tidoute, Pa.; J. T. Henderson and H. C. London of Lenoir, N. C., and T. B. Finley of North Wilkesboro, N. C. Surveys are reported being made.

N. C., Durham.—Gilbert C. White, chief engineer of the Durham & Danville Railroad, says that surveys are now in progress. Line will be about 50 miles long, with maximum grade of 1 per cent. His offices are at Charlotte and Durham, N. C.

N. C., Scotland Neck.—A. Paul Kitchen of Scotland Neck is reported interested in a proposition to build a railroad from Littleton to Hamilton, N. C., 60 miles, via Brinkleyville, Enfield, Scotland Neck and Palmyra.

Okla., Ardmore.—The Rock Island lines, it is reported, will build a connection from Ardmore west to Waurika, Okla., about 50 miles. J. B. Berry is chief engineer at Chicago, Ill.

Okla., Beaver.—F. C. Tracy, one of the directors, is quoted saying that the Beaver, Meade & Englewood Railroad Co., which proposes to build a line from Beaver to Meade and Englewood, Kans., will also build a six-mile connection to the Wichita Falls & Northwestern Railway.

Okla., Butler.—Maney Bros., 126½ Main St., Oklahoma City, Okla., are reported to have the contract to build a 30-mile extension of the Clinton & Oklahoma Western Railway from Butler up the Washita Valley to a point near the center of Roger Mills county. Construction is to begin immediately. Thomas Nance is president of the line.

Okla., Chattanooga.—The Rock Island system is reported surveying for a contemplated extension from Chattanooga, Okla., to Electric, Tex., about 30 miles. J. B. Berry, Chicago, Ill., is chief engineer.

Okla., North End.—The Enid Interurban Traction Co. is reported contemplating an extension of three miles from Enid to North End. H. M. Spalding is general manager.

Okla., Oklahoma City.—Oklahoma City has voted bonds to aid the proposed Oklahoma Northwestern Railroad from Oklahoma City to Woodward, Okla., about 150 miles, and John W. Shartel, vice-president and general manager of the Oklahoma Railway, who is interested, is quoted saying that one route has been located and that engineers are locating another. A choice will be made by March 15 and the line completed by the end of the year. Right of way, terminal sites, bonuses, etc., have been obtained for part of the route.

Okla., Shawnee.—C. T. Edwards, one of the promoters of the proposed line, and C. A. Hargraves, general manager, are reported saying that construction of the Shawnee Interurban Railway to Oklahoma City, about 40 miles, is assured; financial arrangements will be completed within 60 days, and construction will then begin via Dale, McLoud, Harrah and other points. C. G. Young is consulting engineer. Others named as interested are E. L. Vonsussmich of Delven, Wis.; J. D. Price of Chicago, P. P. Shepherd and Charles Rollo of Chester, Ind.

S. C., Spartanburg.—The Spartanburg & Glenn Springs Railroad Co. has been chartered with authorized capital from \$100,000 to \$250,000 to build an electric line from Spartanburg to Glenn Springs, S. C., 14 miles. Incorporators are J. B. Lee, Jr., J. T. Harris, N. F. Walker, W. H. Herring, A. M. Law, F. H. Knox, F. L. Liles and J. Wright Nash.

Tenn., Chattanooga.—Franchise is reported finally granted to the Chattanooga Traction Co. for its proposed line to Walden's Ridge and to the west of the city and across the Tennessee River. C. E. James and others are interested.

Tenn., Bluff City.—A letter says that J. T. Felton of Bluff City is general manager and also contractor for the railroad of the Black Mountain Lumber Co. from Bluff City to timber lands, about eight miles. Track is 42 inches gauge.

Tenn., Memphis.—The Nashville, Chattanooga & St. Louis Railway is reported to have purchased 35 acres of land at Berclair, near Memphis, making 100 acres on which it will build yard tracks and other improvements. Hunter McDonald, Nashville, Tenn., is chief engineer.

Tenn., Memphis.—E. F. Mitchell, chief engineer Missouri Pacific Railway, St. Louis, says that the press report which said that \$700,000 would be spent between Memphis and Bald Knob, 91 miles, was in error. The improvements contemplated consist only of ballasting the main line between Wynne and Bald Knob, Ark.; 45 miles, which will be done by the company's forces.

Tenn., Tresswell.—W. M. Shipman of Tresswell says that those interested are not ready to announce plans of the Chicago, Tennessee & Gulf Railroad Co., which was reported planning construction from Fox Bluff, on the Tennessee Central Railroad, south via Tresswell to Sheffield, Ala. Preliminary work is completed. (See Manufacturers Record of January 11, 1912.)

Tex., Bellville.—Local business men are reported to have decided to build an interurban railway from Bellville to La Grange, Tex., via Industry and Nelsonville, about 40 miles. C. F. Hellmuth, president of the First National Bank of Bellville, may be able to give information.

Tex., Broadus.—The Knox Lumber Co. of Livingston, Tex., is reported to have begun survey for a railroad from Broadus via Hempill to the Sabine River.

Tex., Greenville.—Charter is reported filed for the Greenville & Whitewright Northern Traction Co. of Whitewright, Tex., to build a

line from Greenville via Merritt, Blue Ridge, Westminster and Whitewright; capital \$216,000; incorporators and directors, A. R. Nicholson, J. W. Castleberry, H. A. Barsun, A. W. Defee, J. E. Morris and W. H. James of Greenville and S. M. Dickens of Merritt, Tex.

Tex., Hillsboro.—The Missouri, Kansas & Texas Railway is reported back of the plan to build a railroad from Hillsboro to Whitney, Tex., 12 miles, for which J. C. McDaniel was reported making survey. A. M. Acherson, Dallas, Tex., is chief engineer of the M., K. & T.

Tex., Laredo.—The Rio Grande & Eagle Pass Railway Co. is reported planning an extension along the Rio Grande. R. W. Davis, Laredo, Tex., is chief engineer.

Tex., San Angelo.—J. J. Lanin of New Hampton, Iowa, is quoted saying that he proposes to build a railroad from San Angelo to Brady, Llano, Fredericksburg and Waring, connecting at the latter with the San Antonio & Aransas Pass Railway. Chicago capital is said to be interested.

Tex., San Antonio.—Actual construction is reported begun 10 miles from San Antonio on the road to Pleasanton for the proposed Mexico, San Antonio & Gulf Railroad, planned by J. E. Franklin of St. Louis, president of the Crystal City & Uvalde Railroad. A. R. Ponder, vice-president and general manager of the latter at Crystal City, Tex., will have charge of the construction.

Va., Doswell.—Chas. W. Luck, Tappahannock, Va., secretary of the Richmond, Washington & Chesapeake Railway Co., just chartered, says it will build a line 81.7 miles long from Doswell to Freeport, Va., with bridges thus: Rappahannock River, one 80-foot draw span, for 60-foot girder spans and 5400 feet of pile and frame trestle; Mattaponi River, one 60-foot girder span and 294 feet of pile and frame trestle. Other smaller bridges will require altogether 4298 feet of pile and frame trestle. Route is through rough and rolling country. Directors are Channing M. Ward, president; B. Randolph Wellford, vice-president, both of Richmond, Va.; Chas. W. Luck, secretary and treasurer; Edward A. Cannell, chief engineer, both of Tappahannock, Va.; T. M. Carrington of Richmond; Thomas Brown of Hague, Va., and James M. Lewis of Millers, Va.

W. Va., Benwood.—The Ohio Valley Electric Railway Co., with headquarters at Huntington, W. Va., is reported granted franchise for three routes in Benwood. W. W. Magoon is general manager at Huntington, W. Va.

STREET RAILWAYS

Fla., Miami.—The East Florida Traction Co. has applied for a street-railway franchise in Miami through A. A. Boggs, attorney. The trustees named are F. B. Shotts, C. T. McCrimmon, A. A. Boggs, T. V. Moore and Dwight MacDonald.

La., Baton Rouge.—Application is made to the City Council for street-railway franchise for a seven-mile line north and south across the city by N. Dougherty, O. B. Steel, Eugene Cazedus and James E. Edmonds.

Tex., Tyler.—Thomas O'Hara of Dayton, O., who, it is reported, holds a street-railway franchise in Tyler, Tex., is quoted saying that construction will begin about March 1. From five to seven miles of line are to be built before November 1 next.

Atlanta Manufacturing & Supply Co.'s Products.

The products of the Atlanta Manufacturing & Supply Co., recently incorporated with a capital stock of \$100,000 at Atlanta, Ga., will include oil mills, fertilizer machinery, cement plants and general mill equipment. All kinds of elevating, conveying and transmission machinery will also be manufactured and kept on hand for immediate shipment, including spiral steel conveyors, sprockets, gears, pinions, buckets, chains, hangers, collars and couplings; in fact, practically everything used by the Southern mill interests in the supply line. The company also plans an extensive jobbing business in mill and machine supplies, including bolting, hose, packings, tools, hand machinery, etc. The establishment of this company gives additional opportunities for the Southern manufacturers to obtain prompt deliveries and to get any piece of machinery desired in case of emergency. Its engineering department will furnish plans and estimates for mill and special construction work. The amount of sales booked and the business already in hand indicates that the company is meeting the demand which has existed in this section. The officers of the company are J. O. Bailey, president and treasurer, and L. J. Leary, vice-president and general manager.

MACHINERY, PROPOSALS AND SUPPLIES WANTED

Manufacturers and others in need of machinery or supplies of any kind are requested to consult our advertising columns, and if they cannot find just what they wish, if they will send us particulars as to the kind of machinery or supplies needed we will make their wants known free of cost, and in this way secure the attention of manufacturers and dealers throughout the country. The Manufacturers Record has received during the week the following particulars as to machinery and supplies wanted.

Bakers' Machinery.—A. Naessens, Rue du Cheval Noir 27, Brussels, Belgium, wants catalogues and prices on kneading, mixing, dough-cutting and other machinery for bakers' use.

Boiler.—See "Electrical Machinery."

Boiler Flues.—Mansfield Ice Co., Mansfield, La., will want 4x17 boiler flues.

Boiler.—Leesburg Ice Co., Leesburg, Fla., wants prices on 150-horse-power boiler.

Boilers.—Ray E. Pickrel Lumber Co., Chandlerville, Ill., wants two second-hand boilers with diameters not less than 7 and 18 feet or longer (leaky, dented or weakness for steam pressure no defect for company's purpose.)

Bolt Machines.—See "Pipe and Bolt Machines."

Boring Machine.—Enterprise Foundry and Machine Works, Bristol, Va.-Tenn., wants second-hand car wheel boring machine, 36 inches; also descriptive literature and prices on new equipment.

Brick.—R. A. Brown's Sons, Concord, N. C., want prices on pressed brick.

Bridge Material.—T. C. Owen, bridge superintendent, Courthouse, Memphis, Tenn., invites bids for following material for Shelby county, bridge department, f. o. b. Memphis, freight to be paid and amount to be added to invoice: Portland cement to be specifications of American Society of Civil Engineers for testing material, crushed stone, Mississippi River gravel, screened; "Mississippi Run" and Mississippi River sand; reinforcing rods made of square steel of standard size from one-half to one inch, twisted bar preferred, bids to be made by pound; lumber for making concrete forms and for building bridges; latter to be delivered, freight prepaid, to Oakville, Germantown, Balleys, Collierville, Cordova, Bartlett, Arlington, Woodstock and Millington.

Bridge Construction.—Duval County Commissioners, Jacksonville, Fla., will open bids March 29 for erecting bridge on Pensacola Rd. in Cracker Swamp; 510 feet long; 16 feet wide; concrete floor; steel spans; also two wooden bridges on Fernandina Rd. at Inconstant River; specifications and other data furnished on application to Gall L. Barnard, County Engineer; bids to be addressed to C. W. Ellis, chairman board.

Bottling Machinery.—Aqua Distilling & Bottling Co. (William S. Richardson, Chandler Bldg., Atlanta, Ga., interested), Augusta, Ga., will receive bids in about two weeks on bottling machinery.

Building Materials.—Methodist Episcopal Church South, Rev. W. H. Saunders, pastor, Vicksburg, Miss., wants to correspond with dealers (in Mississippi) relative to building materials for \$9000 church building.

Brass Tubing, Cast-iron Pipe, etc.—Proposals received at office of General Purchasing Officer, Isthmian Canal Commission, Washington, D. C., until 10.30 A. M. February 28, and then opened, for furnishing brass tubing, cast-iron pipe, stovepipe, sheet zinc, solder, steel wire, nails, tacks, screws, cold chisels, hammers, pick handles, shovels, ratchet braces, files, paint brushes, coal barrows, padlocks, water coolers, metallic tapes, manila rope, sash cord, rubber belting, hose, packing, asbestos gaskets, signal flags, bunting, shipping tags and chipped soap. Blanks and general information relating to this circular (No. 684) may be obtained from this office or offices of assistant purchasing agents, 24 State St., New York, and 614 Whitney-Central Bldg., New Orleans; also from U. S. Engineer offices in Baltimore, Philadelphia, Pittsburgh, Boston, Buffalo, Cleveland, Cincinnati, Chicago, St. Louis, Detroit, Milwaukee, St. Paul, Chattanooga, Louisville, Mobile and Galveston; Commercial Club, Kansas City, and Chamber of Commerce, Quincy. F. C. Boggs, Major, Corps of Engineers, U. S. A., General Purchasing Officer.

Bulldozer.—Enterprise Foundry and Machine Works, Bristol, Va.-Tenn., wants new or second-hand bulldozer for capacity equal to ordinary mine car iron; send descriptive literature and prices.

Building Materials.—George T. Perry, High Point, N. C., wants prices on building materials for \$10,000 dwelling.

Burlap.—Crystal Ice Co., Box 153, Washington, N. C., wants to purchase seven or eight-ounce burlap suitable for making bags.

Cable.—Office of Chief Signal Officer, R. J. Burt, disbursing officer, War Department, Washington, D. C., will receive bids until March 2 for furnishing large and miscellaneous lots of from 2000 to 20,000 feet of cable. Send for specifications.

Canning Machinery.—Ruskin Co-operative Mercantile Co., Ruskin, Fla., wants information and prices on vegetable canning machinery.

Canning Machinery.—P. D. de Pool, P. O. Box 297, Havana, Cuba, wants information on canning tomatoes and peppers and making pickles; also catalogues and prices on machinery.

Canning Machinery.—W. J. Peppard, Nashville, Ark., wants information on canning plant of 20,000 daily capacity; also prices on machinery.

Car Wheels.—R. E. Young, 558 Randolph Bldg., Memphis, Tenn., wants prices on annealed cast-iron car wheels; also pressed-steel car wheels from 14 to 20 inches diameter for use on light industrial cars.

Cars.—George H. Crafts & Co., Dublin, Ga., will want light platform cars for use at Miami, Fla.

Cement.—Bay Minette Concrete Co., Bay Minette, Ala., wants prices on cement in car lots.

Cement.—U. S. Engineers Office, J. A. Woodruff, Captain, Engineers, Vicksburg, Miss., February 12, 1912. Sealed proposals for furnishing about 3000 barrels of American Portland cement, delivered at Felsenthal, Ark., in sacks, will be received at this office until 12 M. March 14, and then publicly opened. Information on application.

Cement-block Machinery, etc.—Kana-wha Engineering Co., Charleston, W. Va., wants catalogues and data on machinery and forms for manufacture of cement blocks, brick and tile.

Chairs.—Bids received until February 21 by Board of Education, Louisville, Ky., for 478 chairs to be distributed in five schools.

Coin System.—See "Metal Checks."

Cotton Rope.—J. D. Wyrick, Bearden, Tenn., wants to correspond with manufacturers of cotton rope suitable for making mops.

Cotton Ties, etc.—O. C. Connelly, Nichols, S. C., wants carload of cotton ties and bagging for immediate or quick delivery.

Carbing and Guttering.—H. E. Moody, City Clerk, Cartersville, Mo., will receive bids until 5 P. M. March 7 for construction of combined concrete curb and gutter on both sides of Main St. from Allen St. to Hatcher Ave.; plans and specifications on file with City Clerk; certified check 5 per cent. of bid; F. B. Newton, City Engineer.

Dies.—New Era Publishing Co., Warrenton, N. C., wants to correspond with manufacturers of steel dies.

Distilling Machinery.—William Wyatt & Co., Box 10, R. F. D. No. 3, Salisbury, N. C., wants prices on machinery for manufacturing sassafras, pennyroyal, cedar and mint oils.

Drainage.—Drainage Commissioners of Sunflower county, Mississippi, will let contracts March 5 for digging about 22 miles open ditches, involving excavation of about 800,000 cubic yards dirt; sealed bids to be accompanied by certified check for \$3500; bonds required of contractors; rights reserved; for further particulars address D. M. Quinn, Indianola, Miss.

Drykiln.—J. C. Pretlow Lumber Co., Point Caswell, N. C., wants prices on second-hand lumber kilns.

Electrical Engineering.—J. E. McClelland, chairman electric-light committee, Atlanta, Ga., will receive bids until 10 A. M. March 11 on cost of making examination and report on electric situation in Atlanta with view to construction of municipal plant; bidders are to examine ground personally and submit proposition to city in specified amount as to what their charge will be, and also submit recommendation as to location,

taking into consideration both steam and water power; present area of city is about 26 square miles, with estimated population of 100,000.

Electric-light System.—Sealed proposals received by Mayor and City Council of Pawhuska, Okla., at office of City Clerk until 5 P. M. March 4 for construction, repairs and extension of electric-light system; include about 25,180 feet No. 6 weatherproof copper, 130 poles complete with crossarms, pins, insulators and braces, 35 strain insulators, 1000 feet of one-quarter-inch guy strain, 33 200-candle-power street tungsten lights, complete, on bracket suspension, and one 25-light constant current regulator and transformer. Plans and specifications will be on file at office of L. C. Willis, city superintendent of water-works and electric-light system; litigation clause required in contract; separate bids also received for material only; certified check for \$50.

Electrical Machinery.—Ray E. Pickrel Lumber Co., Chandlerville, Ill., wants dynamo sufficient for 75 lights.

Electrical Machinery.—Mountain Retreat Association, Rev. R. C. Anderson, president, Montreat, N. C., wants prices on 100-horse-power engine and boiler; will probably want 50-kilowatt dynamo.

Electrical Machinery, etc.—Office of Chief Signal Officer, Capt. R. J. Burt, disbursing officer, War Department, Washington, D. C., will receive bids until March 5 for furnishing large and miscellaneous lots of electrical machinery, including two 10-kilowatt wireless telegraph stations and equipment, brass bearings, fuel pump, electric igniter, etc. Send for specifications.

Electrical Machinery.—Bell Printing Co., W. Roberts, president, 2101 Morris Ave., Birmingham, Ala., wants prices on motors for printing machinery.

Engine.—See "Electrical Machinery."

Engine.—L. L. Kittrell, Ayden, N. C., wants 50-horse-power gasoline engine guaranteed to operate electric plant carrying 1300 to 1500 lights.

Engine.—G. M. & G. Stave Co., A. E. May, manager, Exchange, W. Va., wants second-hand self-contained center-crank 10x10 automatic engine.

Engine.—McKeel-Richardson Hardware Co., 153 Main St., Washington, N. C., wants second-hand stationary engine for mill; 110 to 150 horse-power; first-class condition. Give price, shipping point, etc., in first letter.

Engines.—Consolidated Tramway Co., Roanoke, Va., wants a number of 30 to 40-horse-power steam engines, such as used for automobiles.

Engine and Boiler, etc.—J. H. Gastona, Moss Point, Miss., wants prices on 75-horse-power twin engine, three 30-horse-power boilers and steam superheater.

Engines.—See "Mining Machinery."

Fire-escapes.—John R. Pender, office 520 Main St., Tarboro, N. C., will want fire-escape for three-story Masonic Temple.

Folding Beds.—C. W. Trimble, Monterey, Va., wants prices on folding beds.

Freight-transferring System.—The Business Bourse, 260 Broadway, New York, wants to correspond with manufacturers of machine or system for transferring freight at junction points; possibly overhead trolley or other device for unloading less than carloads.

Fruit-paring Machinery.—The Business Bourse, 260 Broadway, New York, wants to correspond with manufacturers of machines for paring grapefruit and oranges.

Furniture.—Charles Henry, Eustis, Fla., wants prices on church furniture.

Galvanized Iron.—J. H. Gastona, Moss Point, Miss., wants prices on galvanized corrugated iron.

Garage Equipment.—P. G. Millen, Dade City, Fla., wants cuts and prices on machinery to equip automobile garage.

Gasoline Engines.—J. B. Orr, R. F. D. No. 2, Washington, Ga., wants addresses of manufacturers of gasoline engines.

Glass.—Charles Henry, Eustis, Fla., wants prices on stained glass for church building.

Heating Plant.—W. A. Etherton, Stillwater, Okla., wants prices on heating plants of various kinds (vacuum steam system especially) for city hall at Hobart, Okla.

Heating Plant.—Charles Henry, Eustis, Fla., wants prices on hot-air furnace.

Heating Plant.—R. D. Douglas, Greensboro, N. C., wants prices on low-pressure steam-heating plant.

Heating Plant.—Thomas S. Brown, 615 First National Bank Bldg., Roanoke, Va., wants prices on force blast system of heat-

ing, using coils for steam heating blast chamber.

Hoisting Engine.—George H. Crafts & Co., Box 569, Dublin, Ga., want 8 to 10-horse-power double-cylinder single-drum hoisting engine; state make and lowest price.

Hoisting Machinery.—C. E. Jenkins, Bryan, Tex., wants prices on hoist for two wheelbarrows.

Hoisting Machinery.—A. G. Klerr, Tazewell, Va., wants new or second-hand hoisting engine and elevator for hoisting bricks, mortar, etc., in general construction.

Ice Plant.—S. W. Easley, Williamsburg, Ky., wants complete ice plant of two to four tons capacity; state prices.

Ice Plant.—Arctic Ice and Coal Corporation (B. Brown to be addressed), 214 James Bldg., Chattanooga, Tenn., wants prices on 100-ton ice plant complete.

Levee Construction.—Office of Commissioners, Pontchartrain Levee District, New Orleans, La. Proposals received at office of Board of State Engineers, Room 213, New Orleans Court Bldg., New Orleans, La., until noon February 29 for following levee work on Mississippi River, left bank, East Baton Rouge parish, Louisiana: South Boulevard to Protection levee; contents about 25,000 cubic yards; deposit required \$140; bond required \$100; usual rights reserved. Further information, etc., may be obtained from Board of State Engineers.

Machine-shop Equipment.—See "Garage Equipment."

Manufacturers.—See "Special Manufacturing."

Merchandise.—General Business Co., temporary offices 714 Maison Blanche Bldg., New Orleans, La., wants to correspond with manufacturers generally relative to purchasing supplies.

Merchandise.—Central Business Co., temporary offices 714 Maison Blanche Bldg., New Orleans, La., wants to correspond with manufacturers generally relative to purchasing supplies.

Metal Checks.—The Business Bourse, 260 Broadway, New York, wants information on metal numbered checks for coin system for handling charge customers in department store.

Mica.—Lawton Lumber Co., Greenville, S. C., wants addresses of dealers in mica.

Mill Supplies.—John T. Wyatt, Box 10, R. F. D. No. 3, Salisbury, N. C., wants prices on mill picks for dressing furrows on mill spindles, cast boxes and babbitt metal.

Mining Machinery.—Globe Metals, Rare Earths & Oil Exploration Co., main office at 1601 Ohio St., Terre Haute, Ind., David C. Lovelace, manager, Salem, Ky., wants prices on boilers, engines, wire rope, buckets, cars, tanks, circle whips, automatic log washer, two to six-inch pumps, etc., for operating fluorspar or lead mine.

Naval Supplies.—Navy Department, Bureau of Supplies and Accounts, Washington, D. C., will receive bids until March 19 for furnishing 20,000 pounds of phosphor-bronze, miscellaneous lot of monel metal and eight plate steel, schedule 4365; 9000 yards of unbleached muslin and 2500 spools of white cotton, schedule 4366; delivery Navy-yard, Washington, D. C.; also receives bids until March 19 for furnishing one sash door mortising machine, one electric welder, schedule 4362; one chisel mortiser, schedule 4364; delivery Norfolk, Va.; for schedules apply navy pay office nearest navy-yard.

Naval Supplies.—Navy Department, Bureau of Supplies and Accounts, Washington, D. C., will receive bids until March 23 for furnishing 126 squirt cans, schedule 4374; 700 pounds of manganese bronze, schedule 4375; delivery Navy-yard, Charleston, S. C.; also receives bids until March 26 for furnishing 6360 pounds of rivet rod bronze, schedule 4383; delivery Navy-yard, Norfolk, Va.; for schedules apply navy pay office nearest navy-yard.

Ornamental Trimmings.—Thomas S. Brown, 615 First National Bank Bldg., Roanoke, Va., wants prices on plaster and composition ornaments for theater.

Paving.—City of Uniontown, Ala., will open bids within 30 days to construct concrete sidewalks; D. P. Coleman, Mayor.

Paving.—City Council, Beaumont, Tex., receives bids until 10 A. M. March 5 for paving 33,000 square yards on concrete foundation, with vitrified brick, asphalt, bitulithic, creosoted wooden blocks or other material; also 37,000 linear feet concrete curb; certified check \$1000; specifications and other information furnished by C. L. Scherer, City Engineer; bids addressed to J. G. Sutton, City Secretary.

Paving.—J. L. Young, City Clerk, West Point, Miss., will receive bids until March

12 for grading and graveling portion of East Main St., according to plans and specifications of civil engineer to be filed; improvement includes 1137 cubic yards of grading, about 91,555 square feet of macadam, 7 inches thick; also two concrete culverts, 2 feet by 3 feet 5 inches by 30 feet, and 400 linear feet of 18-inch terra-cotta drain pipe; certified check \$250; D. Cottrell, Mayor; C. L. Wood, engineer, Columbia, Miss.

Paving and Curbing.—City of Augusta, Ga., will receive bids until 4.30 P. M. February 27 for furnishing material and setting and laying granite curbing and cement walks at Barrett Plaza, in front of Union Depot; about 1100 linear feet straight curb, 130 linear feet round curb and 15,000 square feet cement walk; bids received separately for curb f. o. b. Augusta; for hauling and setting curb and for furnishing material and laying cement walks; plans and specifications on file with Department of Public Works; Nisbet Wingfield, City Engineer and Commissioner Public Works.

Pipe and Bolt Machines.—L. E. Marshall, shop superintendent Gibbs Machinery Co., Columbia, S. C., wants quotations on belt and motor-driven pipe machines taking up two inches, and from 2½ to 10 inches; also wants prices on bolt machines, similarly operated and taking from one-half to two inches.

Rails.—George H. Crafts & Co., Dublin, Ga., will want light railroad rails for use at Miami, Fla.

Road Construction.—Washington County Commissioners, Chatom, Ala., receive bids until 4 P. M. March 4 for grading, draining and surfacing with sand-clay about five miles of State-aid road; certified check \$400; W. S. Keller, State Highway Engineer, Montgomery, Ala.

Road Construction.—Caddo Parish Police Jury, Shreveport, La., will receive bids until 11 A. M. March 14 for grading, draining and macadamizing or graveling 25 miles of road; specifications, profiles, etc., on file with J. T. Bullen, parish engineer.

Road-grading Machinery.—R. G. Patterson, East Bend, N. C., wants two-horse road grader, on wheels, with about four-foot blade, for farm grading around edge of creek bottoms; give description and price. (Road scraper not wanted.)

Rolling Partitions.—E. I. Greiner, Sturarts Draft, Va., wants to correspond with manufacturers of rolling partitions or doors.

Safe, etc.—Donegan Abstract Co., Seguin, Tex., wants prices on safe, vault and other bank fixtures.

Sewer Construction.—City Clerk, Hannibal, Mo., will receive sealed proposals until 12 noon February 29 for constructing sanitary and storm sewer, district No. 200; specifications, etc., on file at offices of W. H. Youse, City Clerk, and of City Engineer; plans obtainable from City Engineer on payment of \$5; certified check for \$1000 to accompany bids; rights reserved.

Sewer-construction Materials.—City of Monroe, N. C., J. E. Efrid, Mayor, will want prices on various-sized sewer pipe, etc.; also materials for construction of two disposal tanks.

Sewer Construction.—Commissioners of Sewer District No. 2, Batesville, Ark., will receive bids until March 1 for constructing sewer system, consisting of 11,000 feet 6-inch pipe, 3675 feet 8-inch pipe, 2700 feet 10-inch pipe, with manholes, flush tanks, etc.; certified check \$300. Address all communications to George L. Bevins, secretary.

Shredding Machinery.—J. H. Gastona, Moss Point, Miss., wants prices on hog and shredder.

Skidder and Loader.—Tar River Lumber Co., Rocky Mount, N. C., wants one-line log skidder and loader, capacity about 25,000 daily; if second-hand, give detailed condition, make and price; if new, send catalogue, state price and time of delivery.

Smokestack.—Ray E. Pickrel Lumber Co., Chandlerville, Ill., wants one 60-foot by 36-inch smokestack, with hood for two boilers.

Special Manufacturing.—C. E. McDaniel, Homer, La., wants to correspond with manufacturers taking orders for manufacture of patented articles.

Sprinkler System.—Frederick Ausfield, 1024 Bell Bldg., Montgomery, Ala., wants sprinkler system for four-story building.

Stamping Press.—New Era Publishing Co., Warrenton, N. C., wants prices on metal stamping press for light work.

Street Improvements.—D. F. Appenheimer, chairman Seventh Ward Local Board, Portsmouth, Va., will receive bids at office of Bascom Sykes, engineer, 510 Middle St., Portsmouth, until 8 P. M. February 28 for improvement of certain streets in Seventh Ward; specifications, instructions to bidders

and plans may be obtained from engineer; bids to be made on blank forms attached to specifications; bids will be received on any one of following items and on the entire work: Placing concrete under street-railway tracks; paving 16,000 square yards of roadways with bituminous macadam; constructing combined concrete curb and gutters on Pearl St.; furnishing, spreading and rolling on Pearl St. roadway crushed stone eight inches deep.

Tanks.—Eunice Carriage & Machine Shop, Eunice, La., wants two and five-gallon galvanized-iron tanks, capacity of 20 pounds pressure, complete with gauge and air pump, fitted up for one-eighth-inch gaspipe connections.

Tile.—R. T. McEachern & Co., American National Bank Bldg., Tampa, Fla., wants prices on four and eight-inch hollow tile for water shipment.

Tinning.—J. E. Morelock, superintendent Chattanooga Iron and Wire Works, Chattanooga, Tenn., wants information, etc., relative to tinning small manufactured wire novelties.

Tractors.—R. E. Young, 558 Randolph Bldg., Memphis, Tenn., wants information on three-wheeled auto tractors.

Trimmer.—Ray E. Pickrel Lumber Co.,

Chandlerville, Ill., wants prices on 20-foot two-saw side-set trimmer.

Tumbling Barrel.—New Era Publishing Co., Warrenton, N. C., wants prices on tumbling barrel.

Turntables.—H. E. Obenshain, Box 902, Roanoke, Va., wants automobile turntables. Send catalogues and prices.

Unloading Machinery.—See "Freight-transferring System."

Water-works Materials.—City of Alice, Tex., receives bids February 26 on 80-horse-power return-tubular boiler; 500-gallon duplex pump; steam-driven air compressor; also duplicate proposals for gasoline engine and pumps; for improvements to water-works system; for specifications apply to O'Neil Engineering Co., 1503 Praetorian Bldg., Dallas, Tex.

Welding (Electric) Machinery.—J. E. Morelock, superintendent Chattanooga Iron and Wire Works, Chattanooga, Tenn., wants addresses of firms designing and manufacturing automatic machinery for electric welding.

Whims.—See "Mining Machinery."

Wood Pipe.—San Juan Water Co., J. D. Freeman, secretary, San Juan, Tex., wants prices on wood pipe.

INDUSTRIAL NEWS OF INTEREST

Cotton Yarn Mill for Sale.

A cotton yarn mill located in Texas is offered for sale in our advertising columns. The property includes a two-story stone building 85x150 feet, containing 7070 spindles and a complete equipment of modern machinery; also 20 acres of land and 20 houses for operators.

To Engage in Tile Business.

P. A. Finelli has withdrawn from partnership in the Central Mosaic & Tile Co., Seimlar Bldg., Memphis, Tenn., and resigned as manager of the same company, and will engage in the mosaic and tile business in Memphis for himself. In this connection his postoffice address is changed from Box 199 to Box 582, Memphis.

Virginia Bridge & Iron Co. Contract.

Plans for a new \$400,000 bank and office building for the Holston National Bank of Knoxville, Tenn., have been prepared by John K. Peebles of Norfolk. The contract for the steel frame of the new structure has been placed with the Virginia Bridge & Iron Co. of Roanoke at \$56,000. This contract illustrates the wide field reached by the company in its structural steel work.

6000 Acres of Louisiana Wet Lands for Sale.

A desirable tract of 6000 acres of marsh land in St. Bernard parish, Louisiana, 35 miles from New Orleans, is offered for sale in our "Classified Opportunities" columns by N. J. Ciesl, 821 Gravier St., New Orleans. Reclaimed lands adjacent to this tract are reported to be selling at from \$60 to \$100 per acre. It lies in the zone of the Frisco Railroad's new development projects. Until further notice this land is offered at a low figure. Complete information will be given by wire to prompt inquiries sent to Mr. Ciesl.

New Brick Plant Established.

G. W. Isenhour & Sons have established a new brick plant on the Yadkin River, about four miles from New London, N. C., on the Salisbury-Norwood branch of the Southern Railway and also on the Southbound Railway. Machinery manufactured by J. C. Steele & Sons, Statesville, N. C., has been installed, and the plant has a capacity of 60,000 bricks per day. Both face and common brick are being manufactured, and flooring tile will be made. A radiating waste heat drying system of individual patent has been installed and eight down-draft solid-bottom kilns are being used.

New Plant and Branch Offices of the Bucyrus Company.

The additional plant of the Bucyrus Company of South Milwaukee, Wis., which has been under construction at Evansville, Ind., is now completed. Post card illustrations showing the buildings of the plant are being sent out by the Arnold Company, Engineers, 105 S. La Salle St., Chicago. The Bucyrus Company has opened a new office in Chicago, No. 622 McCormick Bldg., under the charge of Carl Horix, who has been appointed central sales manager. The old office in the Monadnock Block has been discontinued. Mr. Horix will have general charge of the sale of steam shovels, dredges, general excavating machinery, railway cranes and pile drivers in the Central States. An office has

also been opened at 707 Alworth Bldg., Duluth, under the management of E. C. Hingson, who will have general charge of sales in and about Duluth and the iron ranges.

Dixon's Silica Graphite Paint on Standpipes.

The durability of Dixon's Silica Graphite paint, manufactured by the Joseph Dixon Crucible Co., Jersey City, is indicated in a statement recently sent to the company by F. R. Salter of the Marion Roofing Works, Marion, O. In this case the original painting was done in 1902, the paint being applied to the iron standpipe of the Marion Water Co. It was painted again in 1907, and it is stated that at the present time the paint does not show appreciable wear, and Mr. Salter considers that the paint is good for five more years, or even longer. The painting was done for the water company under contract, Mr. Salter being in no way interested in the company.

Delta Lands of the Rio Grande.

The Mercedes Land Corporation of Mercedes, Tex., has taken over 6000 acres adjoining the town of Mercedes, and proposes to sell it in 40-acre tracts to farmers. The company operates private cars from the north for two trips each month, bringing prospective purchasers to investigate the land before closing sales. The land is under one of the large irrigation systems, and it is stated that over \$100,000 has been expended in completing canals, roadways, etc., to these 40-acre tracts. The land is located in the rich delta of the Rio Grande, where the growing season is continuous. It is becoming known as a winter vegetable country and is adapted to sugar-cane, corn, cotton, alfalfa, citrus fruits, vegetables, etc.

Atlanta Branch of the Baltimore Electrical Supply Co.

The Baltimore Electrical Supply Co., Inc., of Atlanta, Ga., which was recently granted a charter with a capital stock of \$25,000, with W. J. Flannery president, Francis J. Kernan secretary, J. J. Smith general manager and C. M. Murray treasurer, will open its doors for business about March 1. The store and offices of the new company are located on Marietta St., in the center of business activity. It will represent leading manufacturers of electrical goods, carrying a large stock at all times in Atlanta, in order to make immediate shipments upon receipt of orders. It will cover Atlanta and Georgia thoroughly and will also extend its sales to South Carolina, Tennessee, Mississippi, Florida and Alabama. An office will also be maintained in the Woodward Bldg., Birmingham, under charge of J. A. Swanton, who has been well known in the electrical business in that territory for many years. The company expects to handle a large number of orders, and will keep the stock at Atlanta well supplied to fill all requirements. This is a branch of the Baltimore Electrical Supply Co., 300 N. Calvert St., Baltimore.

TRADE LITERATURE.

Automatic Fire Protection.

A booklet which describes in detail the installation and operation of Grinnell automatic sprinklers has been published by the General Fire Extinguisher Co., Providence,

R. I. The title of this booklet is "Automatic Fire Protection," and it includes a number of sketches which give a very clear idea as to how the system is applied to any particular building under various conditions. Illustrations showing the details of the sprinkler head, dry pipe, alarm valves, etc., are so presented that the entire operation may be readily followed. It may be obtained upon request to the General Fire Extinguisher Co.

Architectural Terra-Cotta in Catholic Churches.

The extensive use of Atlantic architectural terra-cotta in Catholic churches and institutions is described in a booklet recently issued by the Atlantic Terra-Cotta Co., 1170 Broadway, New York, with Southern branch, the Atlanta Terra-Cotta Co., at East Point, near Atlanta, Ga. The booklet contains over 40 illustrations of entire buildings and remodeled details of parts of buildings. Besides being of special interest to those who contemplate construction work, it shows the remarkable adaptability of Atlantic architectural terra-cotta to various forms of design. It will be sent on request to anyone interested in such work.

Corrosion of Boiler Tubes.

A summary of corrosion tests of wrought iron and steel tubes and extended abstracts describing the method of carrying on the tests, the opinions of authorities, actual results in service and a table of results of investigation of such corrosion are contained in bulletin No. 4 of the National Tube Co., Frick Bldg., Pittsburgh. These tests were made under supervision of naval inspectors under the Bureau of Steam Engineering of the Navy Department. The National Tube Co. gave the use of its laboratory at McKeesport and other assistance in making the tests. They were made in 12 tanks, each tank containing 16 samples. Thirty-two photographs taken at different times during the tests are included in the bulletin.

Cork Insert Pulleys, Friction Gears and Clutches.

The efficiency obtained in pulleys, frictions and clutches by the use of cork inserts as applied by the Cork Insert Co., Devonshire Bldg., Boston, is shown by tests made at the Lowell Textile School. The particulars of these tests are published in a booklet published for distribution by the company. Another booklet issued by this company contains hundreds of statements regarding the results obtained with cork insert equipment. The use of cork inserts in the rim of pulleys and the friction surfaces of clutches, etc., has been found to increase the holding power and to prevent slipping and other belt or brake troubles. The booklet containing the letters from users of cork insert installations is entitled "Here's the Proof." Both of these booklets will be sent to interested persons on request.

The Triumph Chronicle.

Believing that one of the great forces of modern business is co-operation, the Triumph Electric Co. and the Triumph Ice Machine Co., Oakley, Cincinnati, O., with a view of increasing effective co-operation with their branches, salesmen and agents throughout the country, as well as with manufacturers and users of electrical and refrigerating apparatus, have inaugurated the publication of the Triumph Chronicle, to be published monthly. The first number contains views of the various machines manufactured by the Triumph Electric Co. and the Triumph Ice Machine Co., a partial view of the main assembling shop and illustration of a 300 K. V. A. three-phase generator, a statement of advantages of variable-speed motor drives and other interesting information. This monthly publication and the bulletins issued by the company will be sent to interested persons on request.

Gurney Passenger and Freight Elevators.

Following the tendency on the part of architects and builders to locate their offices above 23d St., New York, the Gurney Elevator Co. has removed to the new Gurney Bldg., 62-64 W. 45th St. This new building affords the larger office space required for the rapidly-increasing business of the company. The building is shown as the front page of a folder recently issued by the company announcing this change, and also noting the different types of Gurney elevators, with a statement of some of the prominent installations made. They include single and double worm-gear electric elevators, traction-type electric passenger elevators for high-speed service, automatic control electric elevators for residences and automatic electric dumb-waiters. Among the prominent installations mentioned are seven elevators in the

Waldorf-Astoria Hotel, New York; 50 elevators for Trinity Corporation; 83 for the Bush Model Factories, South Brooklyn, N. Y., and 48 at the Chelsea Piers, New York.

International Gas Engine Co.'s Engine.

The International Gas Engine Co., Cudahy, near Milwaukee, Wis., is manufacturing a complete line of high-grade gas, gasoline, oil and producer-gas engines, ranging in sizes from the smallest type of farm engine to the high-power engines for power plants. They are known as "Ingeco" engines. The scope of the line is so comprehensive that it includes an engine for practically every commercial need. This company has been manufacturing some of the largest of gas engines at its Snow factory in Buffalo. Catalogue No. 12 gives descriptions and numerous illustrations of "Ingeco" engines of various types, together with sectional views of valve gears and other parts. One of the illustrations shows four Snow gas engines of 3600 horse-power each installed at the Youngstown (O.) works of the Carnegie Steel Co. Numerous illustrations of farm engines, contractors' portable engines, pump engines, semi-portable engines with gasoline tanks located in the base, and other types are shown.

"Colonial" Motor Oils.

A folder issued by the Borne-Scrymgeour Company, 80 South St., New York, gives information on its "Colonial" brands of lubricants used on land and sea, including motor oil for gasoline cars, Colo grease for transmission gears, Colonial gear case compound for transmission gears, and Silox grease. It is stated that these oils intelligently used leave no carbon, and that one pint of Colonial motor oil will supply the average motor car for 100 miles. This company makes a specialty of "Turbol" for turbine lubrication, and gas cylinder oil for high-duty gas engines using natural, producer or furnace gas. Its experts make a study of supplying special oils for special lubrication under varying conditions, so that each oil supplied may fit the requirements to the best advantage. The folder with prices will be furnished on request.

Chicago Pneumatic Tool Co.'s Electric Drills.

Universal electric drills operating on direct or alternating current and a new line of electric drills for heavy duty are illustrated in bulletins E-19 and E-20, respectively, published by the Chicago Pneumatic Tool Co., Fisher Bldg., Chicago, and 50 Church St., New York. These bulletins treat of the Duntley electric portable tools manufactured by the Chicago Pneumatic Tool Co. The Universal electric drills have the unique property of being capable of running interchangeably on direct current or single-phase alternating current of 60 cycles or less. This feature is of importance to contractors and others who have occasion to do work in various localities which may be supplied with either current. The heavy-duty drills are illustrated in the bulletin as actually engaged in drilling and reaming service on heavy steel car construction. They are extensively used in car shops, shipyards and similar industries. These bulletins will be sent on request.

Automatic Gas-Fired Steam Boilers.

In accordance with its policy of giving efficient service in every line to which its products are applicable, the Gas & Electric Co., Baltimore, is offering for installation gas-fired steam boilers, which are claimed to provide an economical means of supplying live steam wherever steam is required in small quantities. The gas supply is automatically regulated to meet the steam demand, in sizes of boilers from one-quarter horse-power up. A folder issued by the industrial fuel department of this company illustrates and describes the boiler and accessories. It is particularly applicable to providing live steam for jacket kettles, glue and wax melting appliances, for steaming hats and umbrellas, pressing and shaping all kinds of cloth and leather goods, for use in plating tanks, in vulcanizing operations, in drykilns, for restaurant appliances, heating water for industrial plants, etc. Estimates for installations will be furnished on request to the Gas & Electric Co., industrial fuel department, Lexington and Liberts Sts., Baltimore.

The Western Special Four-Yard Dump Car.

A dump car, designed of particularly staunch construction for unusually hard service, is being manufactured by the Western Wheeled Scraper Co., Aurora, Ill., and is known as the Western Special Four-Yard Car. As compared with the well known

Standard Western Four-Yard Car, steel I-beams have been installed in place of oak for the draft beams. This permits rigid attachment of the draft rigging to the beam, and all possibility of splintering or crushing the ends of the beams is removed. The new design has four malleable socket and bed hinge castings instead of three as in the Standard car, a steel plate being used between the hinge and socket. The wheels are 20 inches in diameter and the axles are forged M. C. B. style and supplied with collars, the steel being made under M. C. B. specifications. The journals are 3 1/2 x 6 inches. The arch bars and truck angles are also heavier than in the Standard. Complete specifications, description and an illustration of this car are given in a special circular issued by the company, which will be sent on request.

Wire and Wire Rope.

The development of wire rope manufacture, since its beginning in 1840, by John A. Roebling is described in the "Wire Rope and Wire" catalogue of John A. Roebling's Sons Co., Trenton, N. J. The plant now consists of three sets of factories, two of which are located in Trenton and the third at Roebling, N. J., about ten miles south of Trenton.

Detailed information and numerous illustrations of the company's products are given in this 182-page catalogue. Tables are included for different sizes and construction of wire rope, breaking strengths based on actual tests of full-size sections, prices per foot, proper working loads and diameter of drums or sheaves to be used for these ropes. Several pages are devoted to general information about wire rope. Illustrations of the various equipment, including blocks, riggers' vise, track rollers, wire rope clips and plants, sockets, turnbuckles, etc., are included. The subject of transmission of power by wire rope is treated, including underground haulage, logging, quarrying, oil well drilling, elevator hoists, ship rigging and towing, dredging, cable railway work, wire rope ferrying, etc. The use of wire rope in suspension bridges, for long cable spans and for catenary construction in supporting trolley wires are illustrated and described. The catalogue includes practically all kinds of wire rope, and wire rope fastenings made of iron, copper, brass and steel; also galvanized and hard copper, telegraph and telephone wire. Information in addition to that given in the catalogue will be supplied on application to the company at Trenton or any branch office.

Syracuse, N. Y., "Chase;" General Vehicle Co., Long Island, "Electric" trucks; Packard Motor Car Co., Detroit, "Packard;" Morgan Sales Co., 509 W. 56th St., New York, "Morgan;" The Gramm Motor Truck Co., Lima, O., "Gramm." It is expected that great interest will attach to this motor truck exhibit following the experience of the recent New York and Chicago shows, as well as those at Atlanta, New Orleans, Memphis and St. Louis. The South is becoming keenly alive to the possibilities of the motor truck, and the presence in Baltimore of hundreds of Southern merchants and other prospective users of these machines will make this show of particular value and interest.

The Recent Auto Show in St. Louis.

The dealers, visitors and others interested in the auto show recently held at the Coliseum, St. Louis, agree that the show was a big success. The display consisted of passenger cars, motor trucks and delivery wagons and accessories. It was well arranged and carried out, and the attendance was large. Among the motor truck exhibitors were the following: The Gramm Motor Car Co., Lima, O., had on exhibition a 1500-pound motor truck, one of one ton, one of three tons and one of five tons. This exhibit was made by the Cochrane Motor Sales Co. of St. Louis. The Avery Company, Peoria, Ill., through their St. Louis office, made a display of a three-ton truck. These trucks are made in two, three and five-ton sizes, and are equipped with dump bodies when required. They showed a set of interesting photographs, one in particular showing the truck in the rice fields in Arkansas, where the truck successfully negotiated roads covered with mud of a depth from 3 to 20 inches. The Dart Manufacturing Co., Waterloo, Ia., through their St. Louis agents, Werber Bros., displayed two types of light delivery wagons. The Chase Motor Truck Co., Syracuse, N. Y., through their St. Louis agents, showed a delivery wagon and a 1 1/2-ton truck. The White Company, Cleveland, O., displayed a 1500-pound, a 1 1/2-ton and a 5-ton truck. The trucks of the Mack Bros. Co., Allentown, Pa., were displayed by the Mack Motor Truck Co. of St. Louis. These trucks are made in sizes of 1, 1 1/2, 2, 3, 4, 5 and 7 tons. They had on exhibition the 1 1/2, 4 and 7-ton trucks. The latter was equipped with a dump body. These dump bodies are made for the trucks from 3 to 7 tons in four different styles. They are thus able to carry coal, sand, gravel, brick, asphalt and ore, as well as being adapted to a line of contractors' supplies. The same company also made a display of the Saurer motor truck in the 4 1/2 and 6 1/2-ton sizes.

Recent Baltimore Motor Truck Sales.

Recent additions to the already large number of motor trucks used in Baltimore include the following: Two 2-ton General Vehicle motor trucks purchased by the Maryland Ice-cream & Fruit Products Co. from the Consolidated Gas, Electric Light & Power Co.; a 2-ton General Vehicle truck purchased by McCormick & Co., manufacturing chemists and dealers in spices and teas, 105 Concord St.; five General Vehicle trucks purchased by the Gardiner Dairy Co., this being the second order. The Capital Wall Paper Co., 1005 W. Baltimore St., has purchased a one-ton Grabowsky truck, manufactured by the Grabowsky Power Wagon Co., Detroit. The purchase was made through D. C. Walker, the Baltimore agent. The A. F. Lawrence Coal Co. has a new 5-ton Commer truck, D. C. Walker, local agent Wyckoff, Church & Partridge, New York, are the general dealers in the American-made Commer trucks. A sale by Baltimore agents to a company in another city was made for six Federal trucks by the Oakland Auto Co. of Baltimore to a Richmond (Va.) firm. These trucks are manufactured by the Federal Motor Truck Co. of Detroit. Another sale in Maryland was that of the 1500-pound Hart-Kraft Motor car, purchased by R. T. Magnus, Funkstown, Md., from the Hart-Kraft Motor Co., York, Pa. McMahon Bros. of Mt. Washington have purchased a Mack truck with dumping body, manufactured by the International Motor Co., 57th St. and Broadway, New York. The General Vehicle electric trucks mentioned are manufactured by the General Vehicle Co., Long Island, N. Y., and sold by the Consolidated Gas, Electric Light & Power Co., Baltimore. This company has a large service garage in Baltimore for electric commercial vehicles exclusively, in which 75 trucks may be cared for and have the storage batteries charged at one time. A flat rate is made for storing, inspecting and making minor repairs and furnishing the current for charging batteries by the company, so that the electric vehicles using this garage and service station may be at all times in good working condition.

MOTOR TRUCK AND TRACTOR NEWS

New Orleans Automobile Show.

The automobile and motor truck show being held in the Washington Artillery Armory, New Orleans, this week, is the finest and most extensive ever held in New Orleans. It has required 50 freight cars to haul the different exhibits to New Orleans, which means that \$5000 in freight alone has been expended on the project. It is reported that big crowds are attending the exhibition and that its success is assured. It includes many motor trucks, as well as the usual number of automobiles.

Christie "Front Drive" Tractor.

The use of the Christie "Front Drive" tractor by the New York Fire Department is attracting attention to the possibilities of this means of adapting ordinary fire engines to being hauled by motor power. The pioneer tractor of this type consists of a 90-horse-power motor supported by two wheels. The whole device weighs only 4200 pounds, and one of its chief advantages lies in the fact that it eliminates the necessity of "scrap-heaping" all of the valuable fire apparatus already in use. With the Christie device present engines, water towers, hose carts, hook and ladder wagons, etc., drawn by horses can be utilized, since it is only necessary to attach a Christie "front-drive" to the engine. This can be done in about fifteen minutes. When attached it makes the fire engine appear as a symmetrical machine. Mr. Christie is one of the foremost inventors and is an engineer of great ability. This tractor is manufactured by the Front Drive Motor Co., Hoboken, N. J., with C. J. Cross & Co., 141 Broadway, New York, agents for New Jersey and the Southern States.

Motor Fire Engines in the South.

An order has been placed by the city of Jacksonville, Fla., for one motor-driven, quick-raising aerial truck, one combination chemical engine and hose motor car and one high pressure hose motor car. This order has been placed with the American-LaFrance Fire Engine Co., Elmira, N. Y. With the installation of these machines the equipment of the Jacksonville fire department will be greatly improved. Another installation of motor apparatus ordered from the same company is for Waycross, Ga. This includes a type-10 combination chemical and hose motor car. It has a 4-cylinder motor of 75-horse-power and is equipped with a 40-gallon chemical tank, hose body to carry 1200 feet of 2 1/2-inch hose; also chemical hose, axes, ladders, etc. The reorganization of the Savannah Fire Department with the installation of automobile fire-fighting machines has now been completed. The department now has thirteen of such machines. The two pumping engines, which completed the order, were placed in commission last week, after having been given a severe test. All of the machines have developed a capacity greater than guaranteed. With the exception of the trucks and the first and second assistant chief's buggies, there is not a horse-drawn vehicle in the department.

Hydraulic Variable-Speed Transmission.

Motor trucks equipped with a hydraulic variable-speed transmission are now on the market. A five-ton truck of this type is built by the American-La France Fire En-

gine Co. of Elmira, N. Y. It is driven by a four-cylinder, four-cycle gasoline engine of 48 horse-power. The hydraulic transmission used is the Manly drive. The drive, as applied to the five-ton truck, consists of a pump driven by the crankshaft of the engine and two motors applied to the differential shaft of the truck. These hydraulic motors are driven by oil supplied to them by the pump on the engine crankshaft. The stroke of the pump remains constant, and the speed of the motor is changed as desired by varying the length of its stroke by means of a single control lever. Power is transmitted from the differential shaft to the rear wheels by the familiar double-chain drive commonly used on other motor trucks. The use of the hydraulic transmission makes unnecessary any change gears, clutch, differential gears or service brakes. An emergency brake of the expanding drum type is provided on the rear wheels. The truck is designed for a maximum speed of 12 miles per hour going ahead, and 3 miles per hour on the reverse. Any speed whatever between these two limits can be obtained by means of the hydraulic transmission. This truck is being placed on the market by the Hydraulic Truck Sales Co., 177 Broadway, New York City.

The Baltimore Automobile Show.

The annual exhibit in Baltimore of automobiles and motor trucks at the Fifth Regiment Armory promises this year to exceed all previous shows, both in the number of exhibitors and in the attendance. The number of cars exhibited is far beyond that at last year's show, and for this reason the commercial car exhibit will appear after the pleasure car show is over. The show opened Tuesday with automobile sections and space for accessories, etc., filled. This part of the show will extend to include Saturday, February 24. The commercial car exhibit will be made from the 26th to the 28th, inclusive. H. Milton Luzius, the secretary of the Automobile Club of Maryland, under whose management the show is held, is enthusiastic over the prospect of its proving a successful event in every way. Among the manufacturers to be represented in the commercial car exhibit are the following: The International Motor Co., 57th St. and Broadway, New York, makers of the Mack truck and the Saurer truck; the International Harvester Co., "International" truck; Wyckoff, Church & Partridge, New York, "Commer" truck; The Pierce-Arrow Motor Car Co., Buffalo, "Pierce-Arrow;" Peerless Motor Car Co., Cleveland, "Peerless;" Chalmers Motor Co., Detroit, "Chalmers;" Autocar Co., Ardmore, Pa., "Autocar;" Ford Motor Co., Detroit, "Ford;" White Motor Co., Cleveland, "White;" Federal Motor Truck Co., Detroit, "Federal" one-ton trucks; Cadillac Motor Car Co., Detroit, "Cadillac;" American Locomotive Co., 1886 Broadway, New York, "Alco" trucks; B. C. K. Motor Car Co., York, Pa., "Kline;" Metzger Motor Car Co., Detroit, "Everitt;" B. F. Board Motor Truck Co., Alexandria, Va., "Board" truck; Seltz Automobile & Transmission Co., Detroit, "Seltz;" Elmore Manufacturing Co., Clyde, O., "Elmore;" Lozier Motor Co., Detroit, "Lozier;" Atterbury Motor Co., Buffalo, "Atterbury;" Sampson-Alden Manufacturing Co., Detroit, "Sampson;" Kelly Motor Truck Co., Springfield, O., "Kelly;" Chase Motor Truck Co.,

Bird's-Eye View of the Manufacturers Record as Sketched by a Few of Its Readers

Typical Illustrations of How Thousands Regard This Publication

What It Has Done to Advertise the South

W. B. Mitchell, Chattanooga, Tenn.:

I always have the RECORD for each year bound for handy reference. I thoroughly appreciate the large, persistent work you have been doing for the South for very many years. You have done more to advertise and help the South than almost all other factors combined. No one not an extensive reader has any idea whatever of the immense work you have been doing for the South. It was many years before the country began to take right serious notice of what you were saying and doing, but they are certainly taking notice now. Personally, as a Southern man with business interests and property in the South, I feel indebted to you greatly.

Absolutely in a Class by Itself

Clarence B. Douglas, secretary, Muskogee, Okla., Commercial Club:

We agree with the statement so frequently made that as an industrial development journal, dedicated to the upbuilding of the South and Southwest, the MANUFACTURERS RECORD is absolutely in a class by itself, and again desire to express our appreciation for the valuable service it has rendered not only Muskogee, but all of that larger territory its circulation covers.

Information in Daily Bulletin Always Found Reliable

G. E. Carlyle, president Carlyle Paving Brick Company, Portsmouth, Ohio:

The results we have secured from our advertisement in the MANUFACTURERS RECORD have been very satisfactory. We received this morning an inquiry for a large quantity of paving brick, and the writer mentioned the MANUFACTURERS RECORD. We expect to continue our advertisement with you as long as we can secure equally satisfactory results.

While we are pleased to acknowledge we have secured results from our advertisement in your journal, we believe the results obtained from your DAILY BULLETIN are equally as valuable to us, as it brings the South before us better than we could get it in any other way, and this information has always been found reliable.

Essential to Every Household and Office

Walter Sharp, Norfolk, Va.:

Its editorials are marvels of clearness and instructiveness. Being intimately conversant with its history and progress and knowing its identification with every present and prospective industry, I have wondered why it was ever absent from any one file of business or trade organization. It is my firm conviction that it is an essential to every household and office, for few there are that could not derive a distinct benefit from a study of its pages.

Considered from every viewpoint, no other journal has accomplished a tithe of the good done by the MANUFACTURERS RECORD.

Publication of Equipment Wanted Brought Wonderful Results

Watson-Fitzgerald Corporation, Danville, Va.:

We want to thank you for your several kind notices and wish to state that the result of this is something wonderful, as every mail brings offers of manufacturers of every item needed for equipping a brick yard, many of them giving us full information and suggesting very valuable assistance. We wish to compliment you on the efficiency of the MANUFACTURERS RECORD.

Responsible for a Greater Industrial Expansion in the South Than Any Other Single Factor

E. H. Mayfield, business secretary, Chamber of Commerce, Lynchburg, Va.:

The Lynchburg Chamber of Commerce appreciates very much the great work the MANUFACTURERS RECORD has accomplished in the upbuilding and development of the South generally, and we believe that the MANUFACTURERS RECORD has been responsible for a greater industrial expansion in the South than any other single factor that we know of.

Construction Department and Building News Great Help

W. D. Mendenhall, Guilford Lumber Manufacturing Co., Greensboro, N. C.:

We consider the MANUFACTURERS RECORD a great factor in the upbuilding of the South; in fact, we believe you have the best paper in this country. The Construction Department and Building News is of great help to us in following up prospective customers, and we would not be without the paper.

Needed for Doing Business Successfully in the South

Success Novelty Company, Incorporated, Richmond, Va.:

We find that we have got to have the MANUFACTURERS RECORD in order to do business successfully in the South, and you can enter our subscription for a year, commencing with the first issue after you receive this letter.

One of the Greatest Papers Published

H. G. Garrett, president, Brodhead-Garrett Company, Clay City, Ky.:

I take the paper in the name of the Brodhead-Garrett Company of Clay City, Ky., and have for several years. Think it is one of the greatest papers published.

Small Advertisement Produced Large Results

H. B. Wood, Birmingham, Ala., in sending instructions to continue his advertisement in the C. O. Department, said:

"Yes, almost covered me up with letters and catalogs; must have received a thousand."

Classified Opportunities Advertisement Widely Read

John T. Cochrane, president, Ala., Tenn. & North. Railroad Co., Mobile, Ala.:

Replying to your favor of January 17th in regard to the two advertisements recently placed with you, beg to say that we do not care to have these appear again, and for your information would say that from the number of answers received from various parts of the country there can be no doubt whatever but that the MANUFACTURERS RECORD is widely read.

In a Class by Itself—Greatest Paper on Earth

Henry P. Swartz, Kenbridge, Va.:

A short time ago I noticed an advertisement in your paper by a handle and spoke factory for a foreman. I applied for the position and in less than two weeks secured it, and am now filling the position, I hope, satisfactorily. This, coming at the time it did, when I was open for an engagement, is worth more to me than the RECORD has cost me to date, and I have been a subscriber nearly ten years. But I wish to say that this is only one of a number of actual results obtained from the advertisements alone during this time.

The reading matter is invaluable in a direct and indirect way, made so by the extent and reliability of the information. I do not hesitate to say that the MANUFACTURERS RECORD is the greatest paper on earth of its class—in fact it is in a class by itself.

The South will never know (in fact, the greatest manipulator of figures now living could not calculate) the value the RECORD has been to it. You can count on my being a subscriber for life.

Reliability of News Items Commended

E. A. Hill, of Vaughn-Hill Mineral and Oil Lands, Davis, Okla.:

We are learning week by week that your great publication is constantly increasing in value in our business.

We especially value the MANUFACTURERS RECORD by reason of the valid character and reliability of its news and other items.

Can't Miss Its Facts and Figures

J. R. Alexander, planter, R. F. D. No. 1, Scott, Ark.:

I thought to not subscribe longer for the RECORD, as I am not a cotton planter, but when I think of missing the facts and figures that show so plainly what the South is doing for itself, I feel that I can't do without it.

Can Not Do Without It

Queen City Granite & Marble Works, H. D. Bacon, Charlotte, N. C.:

Enclosed please find check for \$4.00 for renewal of our subscription to the MANUFACTURERS RECORD for the year from January 19, 1912, to January 19, 1913. We find the paper valuable and cannot do without it.

Great Loss to Be Without It

Frank Collins, Pres., Hartford National Bank, White River Junction, Vt.:

Enclosed you will find my check for \$4.00 for a continuation of my subscription to your paper.

I should feel it a great loss to be deprived of reading the MANUFACTURERS RECORD every week.

Found Indispensable

R. J. Edwards, Public Securities, Oklahoma City, Okla.:

Enclosed find my check for \$4.00, for which please send me your valuable publication for one year. My subscription expired recently and I decided not to renew, but I find that the MANUFACTURERS RECORD is indispensable.

Information Published by Manufacturers Record Needed in Buying Land

Francis August Hueber, Harris Trust Building, Chicago, Ill.:

Have you a Blue Book for 1912 for sale? I am contemplating buying 40,000 acres of land in Alabama and desire full information on all Alabama farm products, especially for 1911. What information have you on hand that you will send me?

Keeps Us in Touch With the Wonderful Development of the South

George M. Forman & Co., Chamber of Commerce Building, Chicago, Ill.:

It gives us great pleasure in saying that we have found every issue of your publication extremely interesting. It keeps us in touch with the wonderful development of the Southern States, in which we are widely interested.

NORTHERN CENTRAL RAILWAY COMPANY.

GENERAL OFFICE.

Baltimore, Md., February 14, 1912.

The Board of Directors herewith submit to the Stockholders of the Northern Central Railway Co. a synopsis of their Annual Report for the year 1911:

Operating revenues—all lines directly operated.....	\$12,745,866 84
Operating expenses.....	10,726,344 70
Net operating revenue.....	\$2,019,522 14
Outside operations:	
Total revenues.....	\$10,751 00
Total expenses.....	4,533 19
Net revenue.....	6,217 81
Total net revenue.....	\$2,025,739 95
Taxes on Northern Central Railway and leased lines.....	418,562 69
Operating income.....	\$1,607,177 26
Deduct rentals paid (roads operated on basis of net revenue).....	96,115 43
Net operating income of the Northern Central Railway Co.....	\$1,511,061 83
To which add:	
Interest on investments.....	\$916,501 50
Interest General Account, rents and other items.....	465,549 63
	1,382,051 13
Gross income.....	\$2,893,112 96
Deduct:	
Fixed rentals of leased roads.....	\$315,470 66
Interest on funded debt.....	347,315 00
Hire of equipment, interest on mortgages and ground rents, interest	
Car Trusts and other items.....	390,452 94
	1,053,238 60
Net Income.....	\$1,840,874 36
From this amount there have been deducted:	
Cash dividends aggregating 8 per cent.....	1,547,400 00
Balance transferred to Reserve for Additions and Betterments.....	\$293,474 36
Amount to credit of Profit and Loss 31st December, 1910.....	\$9,657,391 23
Less sundry net debits during the year.....	20,021 90
Balance to credit of Profit and Loss 31st December, 1911.....	\$9,637,369 33

GENERAL BALANCE SHEET (CONDENSED), 31ST DECEMBER, 1911.

Assets.	
Property Investment:	
Road and equipment.....	\$32,044,986 20
Securities owned.....	6,793,982 40
Other Investments:	
Miscellaneous investments.....	6,245 03
Working Assets:	
Cash.....	\$2,258,073 84
Securities issued or assumed—held in Treasury.....	12,000 00
Balances due from other companies.....	947,679 08
Net balance due from agents and conductors.....	335,279 58
Miscellaneous Accounts Receivable.....	166,880 31
Materials and supplies.....	799,912 14
Accrued Income not due.....	4,519,824 95
Deferred Debit Items:	
Temporary advances to proprietary, affiliated and controlled com-	
panies.....	\$195,564 02
Cash and securities in Sinking and Redemption Funds.....	576,000 00
Cash and securities in Insurance and other Reserve Funds.....	1,265,974 55
Working Funds and other Deferred Debit Items.....	16,978 49
	2,054,517 06
Total.....	\$45,434,091 49
Liabilities.	
Capital Stock.....	\$19,342,550 00
Mortgage, bonded and secured debt.....	7,326,215 45
Working Liabilities:	
Balances due to other companies.....	\$1,523,387 92
Audited vouchers and wages unpaid.....	670,835 89
Miscellaneous accounts payable.....	833,544 53
Matured interest, dividends and rents unpaid.....	777,960 00
	3,806,728 34
Accrued Liabilities Not Due:	
Unmatured interest, dividends and rents payable.....	\$132,063 90
Taxes accrued.....	216,198 57
	348,262 47
Deferred Credit Items.....	2,641 52
Appropriated Surplus:	
Additions to property since 30th June, 1907, through Income.....	\$2,324,557 48
Reserves from Income or Surplus, invested in Sinking and Redem-	
ption Funds.....	576,892 38
Invested in other Reserve Funds.....	1,265,974 55
Car Trust Principal charged out in advance.....	379,388 43
Reserve for additions and betterments.....	424,511 54
	4,971,324 38
Profit and Loss.....	9,637,369 33
Total.....	\$45,434,091 49

TRAFFIC.

The number of tons of freight moved was 22,654,778, an increase of 71,706, or .32 per cent. The number of passengers carried was 4,882,417, a decrease of 267,800, or 5.20 per cent.

GENERAL REMARKS.

INCOME.

The gross operating revenues for the year show a small decrease, the passenger revenue increasing but the freight revenue decreasing. The operating expenses also show a slight decrease compared with 1910, but transportation expenses increased, due to increase in the cost of fuel and its transportation, and to the general increase in wages of employees and adjustment in the rate of pay of trainmen being effective for the entire year, as against a portion of the year in 1910.

The Maintenance expenses include \$267,409.01 for extraordinary replacement charges connected with the demolition and rebuilding of Union Station, Baltimore, and its tracks and approaches, and Mt. Vernon repairing and engine-house facilities removed to Orangeville.

Your proportion of advances to the Elmira & Lake Ontario Railroad Co. to pay necessary construction expenditures and its fixed charges and other expenses, which could not be borne by its revenues, was decreased during the year, due chiefly to a reduction in construction expenditures.

The Net Income for the year after the payment of all charges was \$1,840,874.36, a decrease of \$18,251.33 compared with 1910, out of which were paid the regular semi-annual dividends, aggregating 8 per cent., and the balance of \$293,474.36 was transferred to the Reserve for Additions and Betterments, for future construction expenditures.

CONSTRUCTION, EQUIPMENT AND REAL ESTATE.

The Construction, Equipment and Real Estate expenditures for the year aggregated \$2,049,714.73, and consisted mainly of the items hereinafter named:

Construction:	
Baltimore Union Station.....	\$826,725 00
Orangeville Engine-house and Machine Shop (portion of cost).....	24,639 00
Changes in Mt. Vernon Yard.....	82,552 00
Baltimore, Canton, Elevator No. 3, deepening and widening docks, basin and	
channel.....	27,160 00
Northumberland Classification Yard (portion of cost).....	544,818 73
Equipment:	
New locomotives.....	67,171 00

Of the above amount, \$1,281,956.16 was charged to Capital Account and the balance against your Reserve for Additions and Betterments, leaving a balance, including the amount transferred from Income for the year, of \$424,511.54 in the latter account.

It is now obligatory, under the Balance Sheet prescribed by the Interstate Commerce Commission, to include, in the Cost of Road and Equipment, all Construction, equipment and Real Estate expenditures made out of net income or Reserve for Additions and Betterments since June 30, 1907. There is an offsetting liability permitted on the credit side of the balance sheet entitled "Additions to Property since June 30, 1907, through Income."

The value of equipment on the General Balance Sheet also includes \$576,909.49, covering equipment purchased since June 30, 1907, out of the reserve for depreciation of equipment, established under the regulations of the Interstate Commerce Commission by charges against Operating Expenses. From the total cost of the equipment there is then deducted, as will be noted on the balance sheet, the accrued depreciation of equipment, amounting since June 30, 1907, to \$742,311.81, so that the net value of the equipment can be ascertained. In accordance with these regulations this accrued depreciation can be reduced only to the extent of the original cost of any equipment retired, but as the original cost is not sufficient to replace the equipment retired and provide for the accrued depreciation, your Company, in conformity with its established practice, will maintain the standard and value of the equipment by purchasing new equipment to the full extent of such depreciation reserve, and the difference between the \$742,311.81 and the \$576,909.49 will be spent for equipment ordered but not yet received.

The Union Station at Baltimore was opened for service on September 15, and the changes in tracks and other facilities at that point are almost completed.

The new Northumberland Classification Yard, constructed at the joint expense and for the joint use of your Company and the Pennsylvania Railroad Co., and the new yard and engine-house at Orangeville, constructed at the joint expense and for the joint use of this Company and the Philadelphia, Baltimore & Washington Railroad Co., were completed and are now in service.

The enlargement of the Mt. Vernon Yards, Baltimore, referred to in the last annual report, for use in the classification of north and southbound freight traffic, is progressing rapidly, and will probably be completed during 1912.

There were 5090 tons of new steel rail and 238,248 cross-ties used in repairs and renewals during the year.

The status of the proposed lease of your railroad, property and franchises to the Pennsylvania Railroad Co., as fully explained in the annual report for 1910, is practically unchanged because of the litigation pending in the United States Circuit Court for the Eastern District of Pennsylvania and for the District of Maryland, respectively. The lease has been duly approved and authorized by both companies, and by the Public Service Commission of Maryland, and but for the said legal impediment would have been promptly executed and delivery of the same accepted by the lessee. Under its provisions the lease and the rental payments became effective January 1, 1911, and therefore when the lease is fully executed and delivered, it will necessitate a just and equitable accounting between the lessor and the lessee, in such manner as will properly protect and preserve the rights and interests of each party to the lease in conformity with its terms and conditions.

By order of the Board,
JAMES MCCREA, President.

Stockholders may obtain pamphlet copies of the annual report by applying to or addressing H. D. Thompson, Assistant Treasurer, General Office, Southeast corner Calvert and Center streets, Baltimore, Md.; J. W. Marshall, Assistant Treasurer, 55 Cedar street, New York city; Lewis Neilson, Secretary, Executive Office, Broad Street Station, Philadelphia, Pa.

Lynchburg.

The Chamber of Commerce of Lynchburg, Va., has recently published a booklet describing the opportunities for agriculture, fruit-raising, trucking and stock-farming in the counties of Amherst, Bedford, Campbell and Halifax, all of which are closely allied to it in local propinquity and commercial kinship. It is pointed out that the soil of the four counties is adapted to the growing of grains, grasses and the forage crops; that tobacco yields largely and profitably; that apple and peach orchards produce abundantly of fruit of the highest types, and that trucking can be carried on with the certainty of large returns, while the best markets of the country are in such easy reach that good prices may be received for all that can be grown. The book shows further that lands of the quality that bring from \$100 an acre up in the West can be purchased in that section for \$15 to \$50 an acre, and that Western farmers, having learned the facts, are selling their Western farms and coming there to purchase lands just as valuable and available for a small fraction of the price received. Attention is paid to the opportunities presented for dairying and poultry-raising, both of which can be profitably followed because of the suitability of climate, soil and location.

Possibly the chief feature of the book is the fact of its compilation and publica-

tion, for while anything that attracts people and money to the four counties described helps Lynchburg, their metropolis and commercial center, yet the preparation and publication of this book shows a broadminded realization of that fact that does not obtain in many places. It shows the enterprising and liberal spirit of the business men of Lynchburg no less than the merits of soil and climate and transportation facilities of the country that surrounds them. In this it is worthy of emulation and imitation by other communities.

The book, which was written and compiled by E. H. Mayfield, business secretary of the Lynchburg Chamber of Commerce, and Edgar Sydenstricker, is handsomely printed and illustrated and carries an illuminated cover that is both beautiful and appropriate. It is a book well worth receiving, reading and preserving.

Savannah.

The MANUFACTURERS RECORD is in receipt of a handsome book, published by the Chamber of Commerce of Savannah, which deals with the advantages and attractions of that fine old town in a most impressive and instructive manner. It sets forth in short, terse sentences the advantages offered by the city for manufacturing enterprises by reason of the rail and water transportation so abundantly provided, furnishing direct connection with the best markets, and also the advantages

acquiring because of its location with respect to various kinds of raw material. It points out the fact that Savannah's great distributing facilities and low freight rates have rendered it one of the chief wholesale cities in the entire South; the safety of its banking institutions, among which there has never been a failure; its eligible position with respect to cheap food supplies; the opportunities for trucking and intensive farming which the immediately surrounding country presents; the great profit in staple crops which the fertility of nearby farm lands insures; the opportunities for profit in poultry, dairy cattle, beef cattle, sheep, hogs and goats which cheap feed and forage crops and year-round pasturage offer. It shows that the manufacturing business of the city, represented by 146 plants, has increased 88 per cent. since 1900; that the population increased from 52,244 in 1900 to 65,064 in 1910, while during the same period taxable values rose from \$36,131,960 to \$50,500,000, municipal disbursements from \$862,434 to \$1,263,388, postoffice receipts from \$156,352 to \$332,254, exports from \$49,330,255 to \$72,511,610, and that its 15 banks have an aggregate capital of \$8,041,228 and deposits of \$21,871,400. The bank clearances were \$194,279,527 in 1908 and \$271,004,461 in 1910.

The cover design of the book is a beautiful bit of color printing, showing portions of the residence and business sections of the city, a long stretch of water front, with its shipping, and an exquisite bit of country road. The letter press is exceedingly well done, and there are many attractive illustrations of the lovely homes, handsome public buildings and many beauty spots in which the city abounds. The matter was compiled and edited by Joseph F. Gray.

Consolidation at Birmingham.

Chamber of Commerce,
Birmingham, Ala., February 14.

Editor *Manufacturers Record*:

The Board of Trade of Birmingham hereafter will be a division of the Chamber of Commerce, the consolidation of the two bodies having recently been effected. For 16 years the Board of Trade has been a separate organization, and at times has shown a great deal of energy and resourcefulness. The Chamber of Commerce is a younger institution, being formed in 1908 and being the successor of the old Commercial Club of Birmingham, which in its day had been a very active institution. The Chamber of Commerce now, in addition to its own committees, is running in separate departments the Board of Trade, the traffic bureau, farm movement department and industrial bureau.

JOSEPH B. BABB, Secretary.

Paint Technology and Tests. By Henry A. Gardner, assistant director the Institute of Industrial Research, Washington; director scientific section, Paint Manufacturers' Association. Published by the McGraw-Hill Book Co., New York and London. Clothbound. Price \$3.00.

A few years ago the producer and consumer of paints possessed comparatively little knowledge of the relative durability of the various ingredients and of the oils in which they were mixed. Such conditions indicated the need of positive information regarding the value of the painting materials and the advisability of having their qualities determined in a practical manner. With this object in view, paint exposure tests of an extensive nature were started in various sections of the country where climatic conditions differ. This field work was supplemented by laboratory researches into the properties of pigments, oils and other products entering into the

manufacture of paints. A general summary of the results of these tests, investigations and researches are published in the form of a general summary in this book. The purpose of the book is primarily to serve as a reference work on paints and painting. It contains many illustrations of the effects of using the different paints under different conditions, especial attention being given to the illustrations of the testing panels used.

The contents include chapters on paint oils and thinners, driers and their effect, paint pigments and their properties, physical laboratory paint tests, the theory and practice of scientific paint-making, results of practical paint tests, cement and concrete paint tests, structural steel paint tests, and the sanitary value of wall paints.

The demand for structural steel for office building, factories, steel cars, railroad equipment, etc., has greatly increased the output of structural paints and created a demand for painters having the knowledge of the proper materials to use in painting steel. Such knowledge is as important to the painter as a knowledge of how to properly select materials for the painting of wood, and for this reason the author has given a great deal of attention to the subject of structural steel paints.

FINANCIAL NEWS

The MANUFACTURERS RECORD invites information about Southern financial matters, items of news about new institutions, dividends declared, securities to be issued, openings for new banks, and general discussions of financial subjects bearing upon Southern matters.

Review of the Baltimore Market.

Office MANUFACTURERS RECORD,

Baltimore, Md., February 20.

In the Baltimore stock market during the past week prices were generally steady to firm, with considerable activity in bonds.

The trading shows sales as follows: United Railways common, 20 to 19 1/4; do. income bonds, 64 1/2 to 65; do. funding 5s, 87 1/2 to 88; do. notes, 100 1/4 to 100 1/2; do. 4s, 85 1/4 to 85 1/2; Consolidated Gas, Electric Light & Power, 100; do. preferred, 100 1/2 to 100 3/4; do. 4 1/2s, 90 1/2 to 90; do. notes, 100; Consolidated Gas 5s, 100 1/2 to 100 3/4; do. 4 1/2s, 97 1/2; Seaboard Company second preferred, 61 1/2 to 62 1/2; do. 4s, stamped, 87 1/2 to 87 3/4; Mt. Vernon-Woodberry Cotton Duck 5s, 77 1/2 to 77 1/2; G. B. S. Brewing incomes, 3 1/4 to 4; do. 4s, 37.

Bank of Baltimore sold at 167; Mechanics', 29; Fidelity & Deposit, 152; Maryland Casualty, 98; Maryland Trust common, 110 to 108 1/2; do. preferred, 118 to 117 1/2; Colonial Trust, 28; Baltimore Trust, 167 1/2; American Bonding, 76 to 77 1/4.

Other securities were traded in thus: Atlantic Coast Line Consolidated 4s, 96 1/2; do. convertible debenture 4s, 102 1/2; do. Connecticut 5-20s, 92 to 91; do. Connecticut stock, 263; Baltimore Traction 5s, 107 1/2 to 107 1/2; Fairmont & Clarksburg Traction 5s, 100 1/4; do. common, 82; Anacostia & Potomac 5s, 101; do. do. guaranteed, 102 1/2; Augusta & Aiken preferred, 82 1/4; Baltimore Electric preferred, 44 1/4 to 44 1/2; Houston Oil common, 9 1/4 to 9 1/2; do. do. trust certificates, 10 1/2 to 10 1/4; do. preferred, trust certificates, 62 1/4 to 63 1/2; do. dividend certificates, 85 to 85 1/4; Maryland Electric 5s, 99; New Orleans Great Northern 5s, 76 1/4; New Orleans Mobile & Chicago 5s, 94 1/2; Pennsylvania Water & Power common, 62 1/2 to 61 1/4; Baltimore City 4s, 1961, 101 1/4; do. do. 1954, 100 1/4; do. 3 1/2s, 1980, 90 1/4; do. 4s, 1957, 100 1/4 to 100 1/2; do. 3 1/2s, 1930, 95; Consolidation Coal, 100 1/2 to 103 1/2; Pennsylvania Water & Power 5s, 92; Georgia Southern & Florida common, 35; Roland Park Electric & Water 5s, 101; Georgia & Florida 5s, 75 to 76; West Penn Traction 5s, 97; Washington, Baltimore & Annapolis 5s, 83 1/2; Maryland & Pennsylvania incomes, 68; Baltimore Traction (North Baltimore Division) 5s, 110 1/4; Northern Central Railway stock, 127 1/4 to 127 1/2; Baltimore Electric 5s, stamped, 96 1/4 to 96; Charles-

ton & Western Carolina 5s, 107; Georgia & Alabama 5s, 107 1/4; Norfolk & Portsmouth Traction 5s, 89 1/2; Virginia Midland 5th, 107 to 106; Chicago Railways 5s, 101; Lake Roland Elevated 5s, 110; Macon Railway & Light 5s, 101; Washington-Vandemere 4 1/2s, 96; Consolidation Coal refunding 4 1/2s, 92 1/2; Jamison Coal & Coke, George's Creek 5s, 94 1/2; Maryland & Pennsylvania common, 33; Chicago City Railways 5s, 103; Consolidation Coal refunding 5s, 93 1/2; Maryland & Pennsylvania common, 33 1/2; Knoxville Traction 5s, 106 1/4 to 106 1/2; Fort Worth & Denver City 6s, 1921, 112; Baltimore & Annapolis Short Line 5s, 72 1/4; Northern Central 5s B, 110.

SECURITIES AT BALTIMORE.

Last Quotations for the Week Ended February 20, 1912.

Railroad Stocks.	Par.	Bid.	Asked.
Atlantic Coast Line.....	100	135 1/4	135 1/2
Atlantic Coast of Conn.....	100	262	265
Fairmont & Clarks. Trac. Co.....	100	80	85
Fairmont & Clarks. Trac. Pfd.....	100	82	85
Georgia Sou. & Fla. 1st Pfd.....	100	95	100
Georgia Sou. & Fla. 2d Pfd.....	100	76	80
Maryland & Pennsylvania.....	100	33 1/2	34
Norfolk Railway & Light.....	25	26 1/2	27
Seaboard Co. Com.....	100	100	100
Seaboard Co. 2d Pfd.....	100	62 1/2	63
United Rys. & Elec. Co.....	50	19 1/2	20
Virginia Ry. & P. Co.....	100	46	46 1/2

Bank Stocks.	Par.	Bid.	Asked.
Bank of Baltimore.....	100	166	170
City.....	100	100	105
German.....	100	100	100
Mechanics'.....	100	100	100
Merchant.....	100	100	100
Second National.....	100	100	100

Trust, Fidelity and Casualty Stocks.

American Bonding.....	25	76 1/2	77
Baltimore Trust.....	100	167 1/2	168
Colonial Trust.....	50	28	28 1/2
Maryland Trust.....	100	108	110
Maryland Trust Pfd.....	100	109 1/2	110
Maryland Casualty.....	25	90	95
Mercantile Trust & Deposit.....	50	153	154
Safe Deposit & Trust.....	100	60	62 1/2
Union Trust.....	50	100	100
U. S. Fidelity & Guaranty.....	100	179 1/2	180

Miscellaneous Stocks.

Ala. Con. Coal & Iron.....	100	30	45
Ala. Con. Coal & Iron Pfd.....	100	70	70
Baltimore Electric Pfd.....	100	44 1/2	45
Con. Gas, Elec. Lt. & P. Pfd.....	100	110	110
Consolidation Coal.....	100	103 1/2	104
Georges Creek Coal.....	100	7 1/2	7 1/2
Mer. & Miners' Trans. Co., V. T. 100	100	67 1/4	72

Railroad Bonds.

Atlanta & Birmingham 4s.....	89	90	90 1/2
Atlantic Coast 1st 4s.....	102	102 1/2	103
Atlantic Coast 2d 4s.....	102	102 1/2	103
At. Coast (Conn.) 4s, Cifs. 5-20s.....	92	92	92
Atlantic Coast (Conn.) 5s, Cifs.....	104	104	104
Atlantic Coast Line 4s, Cifs.....	86	89	89
Atlantic Coast (S. C.) 4s.....	96 1/2	97	97
Balto. & Annapolis S. L. 5s.....	72 1/2	75	75
Carolina Central 4s.....	93 1/2	94 1/2	94 1/2
Charleston & West. Car. 5s.....	107	107	107
Coal & Coke Railway 5s.....	107 1/2	108	108
Florida Cent. & Penin. 4s.....	92 1/2	93	93
Florida Southern 4s.....	107 1/2	107 1/2	107 1/2
Georgia & Alabama 5s.....	76	78	78
Georgia, Car. & North. 1st 5s.....	106 1/2	106 1/2	106 1/2
Macon, Dublin & Savannah 5s.....	101 1/2	102 1/2	102 1/2
Maryland & Pennsylvania 4s.....	88 1/2	90 1/4	90 1/4
Savannah, Fla. & West. 5s.....	110	110	110
Seaboard 4s, Stamped.....	87 1/2	87 1/2	87 1/2
Seaboard Adjustment 5s.....	100 1/2	100 1/2	100 1/2
Seaboard Air Line Ref. 4s.....	80	82 1/2	82 1/2
Seaboard & Roanoke 5s.....	106 1/2	106 1/2	106 1/2
South Bound 5s.....	107 1/2	107 1/2	107 1/2
Virginia Midland 5th 5s.....	107	107	107
Western Maryland 4s.....	88 1/2	88 1/2	88 1/2
Western N. C. Con. 6s.....	103	103	103
Wilmington & Weldon 5s.....	110 1/4	110 1/2	110 1/2
Washington & Vandemere 4 1/2s.....	97	97	97

Street Railway Bonds.

Anacostia & Potomac 5s.....	101	101	101
Atlanta Con. Street Railways 5s.....	106	106 1/2	106 1/2
Augusta Railway & Electric 5s.....	103	103	103
Balto. Sp. Pt. & C. 4 1/2s.....	97	97 1/2	97 1/2
Baltimore Traction 1st 5s.....	107 1/2	107 1/2	107 1/2
Baltimore Traction (N. B.) 5s.....	110 1/4	111 1/2	111 1/2
Charleston City Railway 5s.....	102	104	104
Charleston Con. Electric 5s.....	95	96 1/2	96 1/2
City & Suburban 5s (Wash.).....	102 1/2	102 1/2	102 1/2
Fairmont & Clarksburg Trac. 5s.....	100	100 1/4	100 1/4
Knoxville Traction 5s.....	100 1/4	100 1/4	100 1/4
Macon Railway & Light 5s.....	101	101 1/4	101 1/4
Maryland Electric Railways 5s.....	90	90 1/4	90 1/4
Newport News & Old Point 5s.....	97	98 1/2	98 1/2
Newport News & O. P. G. M. 5s.....	77 1/2	80	80
Norfolk & Portsmouth Trac. 5s.....	88 1/2	90	90
Norfolk Railway & Light 5s.....	100 1/4	101	101
Norfolk Street Railway 5s.....	105	107	107
United Railways 1st 4s.....	85 1/4	85 1/2	85 1/2
United Railways Income 4s.....	64 1/2	65	65
United Railways Funding 5s.....	87 1/2	87 1/2	87 1/2
United Railways Notes 5s.....	100 1/4	100 1/4	100 1/4
Virginia Railway & Power 5s.....	96	97 1/4	97 1/4

Miscellaneous Bonds.

Ala. Con. Coal & Iron 5s.....	82	86	86
Baltimore Brick 5s.....	82 1/2	84 1/2	84 1/2
Baltimore Electric 5s, Stp.....	96 1/2	96	96
Consolidated Gas 5s.....	100 1/4	100 1/4	100 1/4
Consolidated Gas 4 1/2s.....	97	97 1/2	97 1/2
Con. Gas, Elec. Lt. & P. 4 1/2s.....	90	90 1/2	90 1/2
Consolidation Coal Ref. 4 1/2s.....	92 1/2	93	93
Consolidation Coal 1st 4s.....	97 1/2	97 1/2	97 1/2
G. B. S. Brewing 1st 4s.....	33 1/2	36 1/4	36 1/4
G. B. S. Brewing Income 5s.....	4	4	4
Maryland Steel Co. 5s.....	101 1/2	101 1/2	101 1/2
Mt. Vernon-Woodby Cot. Duck 5s.....	77 1/2	77 1/2	77 1/2
United Elec. Lt. & P. 4 1/2s.....	94 1/2	95	95

SOUTHERN COTTON-MILL STOCKS.

Quotations Furnished by William S. Glenn, Broker, Spartanburg, S. C., for Week Ending February 19.

	Bid.	Asked.
Abbeville Cotton Mills (S. C.).....	76	76
Aiken Mfg. Co. (S. C.).....	85	85

American Spinning Co. (S. C.).....	100	100
Anderson Cotton Mills (S. C.).....	48	48
Arcadia Mills (S. C.).....	93	93
Arkwright Cotton Mills (S. C.).....	95	100
Belton Mills (S. C.).....	100	110
Brandon Mills (S. C.).....	90	95
Brogan Mills (S. C.).....	90	90
Chiquola Mfg. Co. (S. C.).....	100	100
Clifton Mfg. Co. (S. C.) Pfd.....	97	97
Clinton Cotton Mills (S. C.).....	120	120
Courtenay Mfg. Co. (S. C.).....	100	100
Dallas Mfg. Co. (Ala.).....	99	99
Darlington Mfg. Co. (S. C.).....	70	70
D. E. Converse Co. (S. C.).....	90	90
Drayton Mills (S. C.).....	90	90
Eagle & Phoenix Mills (Ga.).....	106	106
Easley Cotton Mills (S. C.).....	162	175
Enoree Mfg. Co. (S. C.).....	60	60
Enoree Mfg. Co. (S. C.) Pfd.....	94	100
Gaffney Mfg. Co. (S. C.).....	60	60
Gainesville Cotton Mills (Ga.).....	72	80
Glenwood Cotton Mills (S. C.).....	120	150
Granville Mfg. Co. (S. C.).....	125	145
Greenwood Cotton Mills (S. C.).....	97	97
Grendel Mills (S. C.).....	90	100
Hartsville Cotton Mill (S. C.).....	100	100
Henrietta Mills (N. C.).....	100	175
Inman Mills (S. C.).....	100	100
King Mfg. Co., J. P. (Ga.).....	80	85
Lancaster Cotton Mills (S. C.).....	130	130
Lancaster Cot. Mills (S. C.) Pfd.....	97	100
Langley Mfg. Co. (S. C.).....	75	75
Laurens Mills (S. C.).....	115	115
Idemeston Mills (S. C.).....	155	160
Lockhart Mills (S. C.).....	65	65
Lockhart Mills (S. C.) Pfd.....	90	100
Loray Cotton Mills (N. C.) Pfd.....	96	96
Marlboro Cotton Mills (S. C.).....	80	80
Mills Mfg. Co. (S. C.).....	102	102
Molokoh Mfg. Co. (S. C.).....	95	95
Monahan Mills (S. C.).....	110	110
Monarch Cotton Mills (S. C.).....	110	110
Newberry Cotton Mills (S. C.).....	125	130
Ninety-Six Cotton Mill (S. C.).....	130	130
Norris Cotton Mills (S. C.).....	110	130
Olympia Cotton Mills (S. C.).....	90	90
Orr Cotton Mills (S. C.).....	90	93
Pacolet Mfg. Co. (S. C.).....	90	90
Pacolet Mfg. Co. (S. C.) Pfd.....	85	100
Parker Common.....	20	20
Parker Preferred.....	45	45
Peiser Mfg. Co. (S. C.).....	120	120
Poe Mfg. Co., F. W. (S. C.).....	110	115
Saxon Mills (S. C.).....	130	130
Spartan Mills (S. C.).....	130	130
Trion Mfg. Co. (Ga.).....	120	120
Tucapau Mills (S. C.).....	100	100
Union-Buttalo (S. C.) 1st Pfd.....	60	60
Union-Buttalo (S. C.) 2d Pfd.....	15	15
Victor Mfg. Co. (S. C.).....	110	115
Warren Mfg. Co. (S. C.).....	80	80
Warren Mfg. Co. (S. C.) Pfd.....	100	100
Washington Mills (Va.).....	28	28
Washington Mills (Va.) Pfd.....	100	110
Whitney Mfg. Co. (S. C.).....	110	110
Wiscasset Mills (N. C.).....	125	125
Woodruff Cotton Mills (S. C.).....	95	100
Woodville Cotton Mills (S. C.).....	85	85
Watts Mills (S. C.).....	90	95
Williamston Mills (S. C.).....	110	125

About Bond Investments.

"The Trend of Investment" is the title of a pamphlet issued by D. Arthur Bowman & Co., Third National Bank Building, St. Louis, and it will be read with interest by investors. Among other things it says: "The average investor, both institutional and individual, is now awakening to a realization of the fact that the well-secured bond is unquestionably the best and safest form of investment for one of small as well as of large means. The security of a bond investment appeals to every man who cannot afford to take great speculative risks or to jeopardize his capital in any manner." Attention is then given to municipal, drainage, railroad and public utility bonds, in regular order, the letter-press being accompanied by appropriate illustrations. It is a very interesting and enlightening publication.

FINANCIAL CORPORATIONS.

Ala., Birmingham.—A. D. Smith & Sons have filed articles of incorporation to do a general real estate and insurance business; capital \$22,000. Officers: A. D. Smith, president; M. D. Smith, vice-president; Albert Lee Smith, secretary and treasurer.

Ark., Fort Smith.—A new building association capitalized at \$5,000,000 is reported being organized by Mayor Bourland, Joseph M. Hill, H. L. Fitzhugh, J. F. Read, Rudolph Ney, John Witherspoon, H. F. Rogers, Samuel McLoud, C. W. L. Armour, L. F. Katzung, E. A. Strong and B. F. Beckman, H. B. Herenden, F. F. Gibson and J. D. Phelps.

Ark., Leslie.—Official: The First National Bank of Leslie chartered; capital \$50,000. Business is

trict Supreme Court; Charles F. Carusi; Robert N. Harper, president of the District National Bank; Eldridge E. Jordan, president of the United States Trust Co. and vice-president of the Commercial National Bank; William H. Ingersoll; Howard C. Shober and Robert J. Wynne. These, with others, will constitute the board of directors.

Fla., Bradley Junction.—Official: A new private bank, to be known as J. O. Whidden & Co., is organized with \$5000 capital; stockholders, W. E. McCormick, J. O. Whidden, J. K. Kirkland and W. Whidden. A. B. Jones is cashier.

Fla., Fort Lauderdale.—Reported that a new bank is to be established. Among those said to be interested are Mayor William H. Marshall, G. O. Webster, W. O. Berryhill and Dr. Holland.

Fla., Jacksonville.—The Forsyth Investment Co. has published its charter; capital \$50,000; temporary officers, John W. Dodge, president; John W. Dupuy, vice-president, and W. H. Dodge, Jr., secretary and treasurer.

Fla., Tampa.—Official: The Provident Homes Association has applied for charter; capital \$1,000,000. Directors: J. F. Wilson, president; W. P. O'Keefe, vice-president and general manager; H. C. Edmonds, secretary, and E. D. Hayman, treasurer. Business is to begin about March 15.

Ga., Atlanta.—The Fulton Loan & Trust Co., capital \$25,000, is reported organized with Mark J. McCord president, Ivan E. Allen vice-president, E. L. Gilmore secretary and treasurer, and Edgar Watkins attorney.

Ga., Atlanta.—Official: The Commonwealth Investment Co. of Atlanta has applied for charter; capital \$100,000. Organizers: A. D. Thomson and Carlos Lyons, Grant Bldg., Atlanta; W. D. Thompson and Harold Hirsch, Candler Bldg., Atlanta.

Ga., Columbus.—The Columbus Agency is reported incorporated with \$50,000 capital to act as general agent in middle western Georgia for the Empire Life Insurance Co. of Atlanta. Officers: J. L. Jessup, president and general manager; John F. Morgan, vice-president; Geo. H. Mason, secretary; J. E. Madre, manager of agents, and J. O. Collier, cashier.

Ga., Lyons.—The Merchants' Bank of Lyons is reported to have made application for a charter; capital \$25,000; incorporators, W. C. Oliver, J. P. Brown, W. E. Meeks and A. O. Thompson.

Ga., Macon.—The People's Bank & Trust Co., capital \$50,000, is reported to have begun business in the Happ Bldg., corner 4th and Pine Sts.; Lee M. Happ, president; C. E. Newton, vice-president; William C. Miller, cashier; directors, J. F. Heard, F. W. Williams, E. S. Wilson, Jr., Robert A. Nisbet, C. E. Newton, John J. McKay, Lee M. Happ, Cooper D. Winn, Jr., C. B. Moore, A. T. Collins, J. H. Bailey, William C. Miller and E. M. Adams.

Ga., Pavo.—Official: The Planters' Bank of Pavo chartered; capital \$25,000, with \$15,000 paid in. Directors: B. O. Wood, president; J. B. Williams, D. M. Adams, T. E. Dixon, W. W. Williams, J. D. Strickland and R. R. Redfearn. Business is to begin about March 1.

Ky., Louisville.—The Great Southern Fire Insurance Co. is reported being organized with \$2,000,000 capital by president, A. E. Willson; vice-president, William S. Montz; treasurer, James E. Gamble; general counsel, James R. Duffin; Albert J. Helker and others.

La., Morgan City.—A new State bank is reported being organized with from \$30,000 to \$50,000 capital.

Md., Brunswick.—Press dispatches state that a new bank is being organized.

Md., Hamilton.—Steps are reported being taken to organize a new bank.

Miss., Hattiesburg.—A new brokerage firm is reported organized by H. L. Shuptrine of Selma, Ala., and J. B. Pullen of Hattiesburg.

Mo., Coffman.—Reported chartered: Bank of Coffman; capital \$10,000; directors, Wm. L. Ponder, C. A. Boyd, Thomas M. Boyd, J. C. Williams and Joseph Gegg.

Mo., Springfield.—Reported chartered: The German-American Bank; capital \$50,000; directors, G. H. Boehm, C. M. Ellis, F. B. Fuson, W. C. Lohmeyer, J. E. Potter, H. P. Moberly, J. T. Long, Alzoa Lark and L. Sutter.

N. C., Charlotte.—The Standard Insurance Co., with an authorized capital of \$100,000, is reported organized by George Stephens, W. H. Wood, Harvey Lambeth, P. C. Whitlock, A. P. Felts, T. C. Guthrie, C. O. Kuester, Ernest Ellison, John W. Todd, J. E. Davis, E. V. Patterson and A. Jones Yorke.

N. C., Charlotte.—The Independence Trust Co., authorized capital \$1,000,000, is reported organized with Julian H. Little as president

and H. A. Morson secretary. This is a change of the Charlotte Trust & Realty Co.

N. C., Murphy.—Official: The Murphy Building and Loan Association, capital \$50,000, incorporated; C. M. Wofford, president; W. Mercer Fain, vice-president; P. C. Hyatt, secretary and treasurer; directors, C. M. Hickerson, J. L. Smathers, C. A. Brown, R. S. Parker, C. E. Wood, A. A. Fain, J. M. Vaughn, D. J. Carpenter; Witherspoon & Witherspoon, attorneys. Business is to begin March 1.

Okla., Collinsville.—The Bank of Collinsville is reported chartered; capital \$10,000; incorporators, John G. Butler, L. S. Butler of Collinsville and C. H. Bessent of Norman.

Okla., Muskogee.—The Territorial Trust & Surety Co., capital \$250,000, is reported organized. Senator H. B. Beeler will be trust officer, and C. J. Haskell and Joseph L. Hall, secretary and treasurer. E. A. Edmondson will have charge of the municipal bond department. The officers and directors are: President, C. N. Haskell; first vice-president, H. B. Beeler; second vice-president, Jay P. Farnsworth; third vice-president, E. A. Edmondson; secretary, C. J. Haskell; treasurer, Joseph L. Hall; directors, J. N. McRoberts, T. J. Collins, H. B. Beeler, C. N. Haskell, John L. Wisener, J. Robt. Gillam, Franklin Miller, W. T. Wisdom, M. G. Haskell, Jay P. Farnsworth and E. A. Edmondson. Offices will be in the Turner Hotel.

Okla., Okemah.—Official: The Okemah Title & Abstract Co. incorporated; capital \$5000; directors, Ed. E. Phillips, president; Frank Phillips, vice-president, both of Okemah; A. B. Phillips, secretary and treasurer; L. E. Phillips and Waite Phillips of Bartlesville, Okla. Business began February 12.

S. C., Coronaca.—The Bank of Coronaca is reported to have been granted a commission; capital \$25,000; petitioners, W. Y. McNeil, W. H. Hornby, W. A. Collins, W. B. Rice and J. Y. Bryson.

Tenn., Rosemark, P. O. Memphis.—The Rosemark Bank & Trust Co., capital \$15,000, is reported incorporated by E. M. Moore, E. A. Thompson, W. P. McQuiston, R. C. McCalla, all of Rosemark, and F. S. Bragg of Memphis.

Tenn., Surgoinsville.—A new bank capitalized at \$25,000 is reported organized with Dr. C. M. Lyons, president; A. T. Bean, vice-president; L. M. Neas, cashier; directors, J. Hale Phipps, chairman; I. B. Arnott, J. L. Campbell, A. D. Tipton, E. M. Frazier of Surgoinsville, and R. L. Alley and Dr. G. M. Reeser of Church Hill. A later report says the institution will be called the Holston Valley Bank and begin business about April 1.

Tex., Bay City.—Official: The Citizens' Trust Co. incorporated; capital \$50,000; organizers, J. W. Moore, M. Thompson, V. L. Letulle, F. S. Robins and A. H. Wadsworth. The purpose of the company is for the accumulation and loan of money without banking or discounting privileges.

Tex., Chrisman.—A new bank is reported being organized with \$10,000 capital.

Tex., El Campo.—The Second National Bank is reported being organized with \$150,000 capital; directors, M. Webb, J. F. Kugela, W. J. Hefner, G. A. Rives. This succeeds the First National and State banks of El Campo.

Tex., Houston.—Reported approved: The South Texas Commercial National Bank of Houston; capital \$1,000,000; Edwin B. Parker, correspondent, Houston, Tex.; C. Dillingham, B. D. Harris, J. E. McAshan, W. B. Chew and J. A. Baker, directors. This succeeds the South Texas National Bank of Houston and the Commercial Bank of Houston.

Tex., Seguin.—Official: The Donegan Abstract Co. chartered; capital \$6000; organizers, Wm. Timmerman, C. H. Donegan, Wm. A. Harboth, F. C. Weiner, A. P. Mueller, R. L. Knolle and W. A. Brenstedt, all of Seguin.

Tex., Seguin.—Official: The Guaranty Loan & Trust Co. of Seguin chartered under banking laws of Texas; capital \$80,000; C. H. Donegan, chairman of board; Wm. Timmerman, president; Wm. Bauer and W. A. Brenstedt, vice-presidents; C. H. Donegan, treasurer; A. P. Mueller, secretary, and B. H. Puls, assistant secretary and treasurer. Business began February 15.

Va., Bristol.—A new bank capitalized at \$25,000 is reported being organized with Dr. C. W. Lyons president, A. T. Bean vice-president, L. M. Neas cashier; directors, J. Hale Phipps, chairman; I. B. Arnott, J. L. Campbell, A. D. Lipton, E. M. Frazier of Surgoinsville and R. L. Alley and Dr. G. M. Reeser of Church Hill. Business is expected to begin about April 1.

W. Va., Wellsburg.—The Farmers' State Bank is reported incorporated with \$100,000

capital by Jesse E. Curtis, C. B. Reeves, S. S. Hedges, H. H. Huffman, J. D. Brady, T. N. Marks, R. Heisley, J. C. Brady of Wellsburg, W. B. Taylor of Bethany.

NEW SECURITIES.

Ala., Eutaw.—An election is to be held in Greene county, it is reported, to vote on \$120,000 of road-improvement bonds.

Ala., Moulton.—March 18, it is reported, an election is to be held in Lawrence county to vote on pike roads bonds.

Ala., Selma.—Official: An official letter says that the City Council has under consideration the question of issuing school-building bonds.

Ala., Stevenson.—March 4, it is reported, an election is to be held to vote on \$14,500 of water-works bonds.

Ala., Union Springs.—Official: Bids will be received until 8 P. M. March 7 by P. L. Cowan, City Clerk, for \$30,000 of sewerage and \$5000 of water-tower 5 per cent. 30-year bonds; dated January 1, 1912; denomination \$500.

Ark., Argenta.—A. B. Gerlach, district secretary, confirms report that the \$75,000 of 5½ per cent. school bonds have been sold.

Ark., Osceola.—The Harris Trust & Savings Bank of Chicago and William R. Compton & Co. of St. Louis have been awarded jointly at 100.1 the \$1,250,000 of 6 per cent. 5-30-year bonds of Drainage District No. 3, Mississippi county.

Fla., Fort Pierce.—Official: The Bank of Fort Pierce on February 14 purchased \$80,000 of the \$90,000 of 6 per cent. 30-year public utility bonds authorized on December 12, 1911, at \$81.578. Dated January 1, 1912. Address Frank M. Tyler, City Clerk.

Fla., Vernon.—Reported defeated: \$350,000 of Washington county road bonds.

Ga., Americus.—The election to vote on \$60,000 of electric-light plant bonds will, it is stated, be held March 20.

Ga., Athens.—The election to vote on \$300,000 of Clarke county courthouse bonds will, it is reported, be held April 3.

Ga., Gibson.—Reported that an election is to be held in Glascock county to vote on \$15,000 of courthouse, \$2000 of jail and \$33,000 of road 4½ per cent. bonds; maturity, one bond each year until 1962; denomination \$1000.

Ga., Columbus.—Press dispatches state that it is proposed to hold an election to vote on \$250,000 of water-works bonds.

Ga., Savannah.—Official: December 6 an election is to be held to vote on \$60,000 of 4½ per cent. 30-year drainage bonds. Date of opening bids not yet determined. Geo. W. Fledeman is mayor.

Ga., Senola.—An official letter confirms report that an election is to be held March 26 to vote on \$10,000 of 6 per cent. school bonds; dated July 1, 1912; denomination \$1000. L. L. Hutchinson is Mayor and B. A. Nolan Clerk.

Ga., Thomasville.—Official: Defeated: Bond election. A. A. Riley is City Clerk.

Ky., Falmouth.—Official: The Citizens' Bank of Falmouth has purchased at \$760 the \$7500 of 1-17-year electric-light bonds; denomination \$500; dated February 1, 1912. Address City Council; W. E. Wilson is City Clerk.

Ky., Lexington.—Notice is given that at 10 o'clock February 19 J. E. Cassidy, Mayor, will offer at public auction the following 6 per cent. improvements bonds: \$2188.11; \$5603.82; \$1935.58; \$1693; \$24,527.25, and \$2317.51, respectively.

La., Morgan City.—Official: Bids will be received until March 1, 1912, by M. D. Shannon, Mayor, for \$50,000 of 5 per cent. 1-40-year sewerage and water-works bonds, voted November 8, 1911; denomination \$500; dated January 15, 1912.

Md., Hagerstown.—The Town Council is reported to have authorized the sale of \$30,000 of police station bonds.

Md., Myersville.—Press dispatches state that a bill is to be introduced in the Legislature providing for \$9000 of light and water bonds.

Miss., Bay St. Louis.—Bids will be received on or before noon March 4 by A. A. Kergosien, clerk Board of Supervisors at Bay St. Louis, for \$25,000 of 6 per cent. 5-year Hancock county road and bridge bonds; denomination \$500.

Miss., Corinth.—Official: Bids will be received at 2 P. M. on April 2 for \$11,500 of 6 per cent. 10-year Alcorn county jail bonds. Address O. M. Hinton, Chancery Clerk.

Miss., Vaiden.—Bids will be received until February 19, it is reported, by James Somerville, chairman, Drainage Commissioners of

Carroll county, for \$30,000 of 6 per cent. 30-year drainage bonds.

Miss., Vicksburg.—Reported voted: \$400,000 of water-works and \$100,000 of street-improvement bonds.

Mo., Fulton.—The Mercantile Trust Co., St. Louis, is reported to have been awarded \$100,000 of 5 per cent. bonds of Fulton Special Road District, Callaway county, at a premium of \$755.00.

Mo., Danville.—Official: April 16 an election is to be held in Montgomery county to vote on \$25,000 of courthouse bonds. E. W. Hunter is County Clerk.

Mo., Kansas City.—Official: The Fidelity Trust Co., Kansas City, has purchased at 101.17 and accrued interest \$30,234.10 of 6 per cent. bonds to pay for lands condemned for park purposes; denomination \$1000; dated September 9, 1911; maturity June 30, 1912. Address Board of Park Commissioners.

Mo., Danville.—On April 16, it is reported, an election is to be held in Montgomery county to vote on \$25,000 of courthouse bonds.

Mo., Kirksville.—Official: Bonds for water-works defeated.

Mo., Marble Hill.—The William R. Compton Bond & Mortgage Co., St. Louis, is reported to have purchased, at \$152 premium, the \$8000 of 6 per cent. Bollinger county courthouse bonds.

Mo., Mountain Grove.—Reported that the Hanchett Bond Co., Chicago, has been awarded, at \$57 premium, the \$30,000 of 5 per cent. 5-20-year water-works bonds.

Mo., Mound City.—An election is about to be held, it is reported, to vote on \$15,000 of sewerage and water-works bonds.

Mo., Springfield.—Reported that bids will be received until noon March 5 by J. H. Langston, City Clerk, for \$100,000 of 5 per cent. 5-20-year sewer construction bonds; denomination \$1000.

N. C., Apex.—Official: The New First National Bank of Columbus, O., on January 10 purchased at \$10.120 the \$10,000 of 6 per cent. 20-year market and town hall and street and sidewalk improvement bonds; denomination \$500; dated January 1, 1912; maturity January 1, 1932. Address J. P. Mills, Clerk and Treasurer.

N. C., Durham.—The sale of \$50,000 of 4½ per cent. school bonds, voted January 16, is reported authorized by the City Council.

N. C., Littleton.—Ulen & Co., Chicago, are reported to have been awarded \$10,000 of 6 per cent. 20-year electric-light bonds at 102.85.

N. C., Murphy.—Official: Bids will be received on the first Monday of April for from \$50,000 to \$100,000 of 30-year township bonds; interest at 5 and 6 per cent. Address L. Mauney, secretary Highway Commission.

N. C., Nashville.—Official: Bunn & Sprull, Rocky Mount, were awarded, at \$70.99, the \$65,000 of 6 per cent. public roads improvement bonds.

N. C., Newbern.—The Newbern Banking & Trust Co. of Newbern, N. C., was awarded, it is reported, the \$45,000 of Mosely Creek Drainage District bonds at a premium of \$362.50.

N. C., Newbern.—Official: Bids will be received until 10 A. M. March 4 for \$10,000 of 5 per cent. Craven county refunding bonds; maturity May 1, 1917. Address S. H. Fowler, clerk Board of Commissioners of Craven county.

N. C., Sanford.—Reported that arrangements are about to be made for the sale of \$100,000 of 5 per cent. Lee county road bonds. Address County Commissioners.

N. C., Statesville.—Reported that J. H. Hillman & Co., Atlanta, were awarded \$10,000 of 5 per cent. 20-year refunding bonds at a premium of \$50.

N. C., Winston-Salem.—Press dispatches state that the public improvement bonds recently voted have been declared valid by the Superior Court.

Okla., Sallisaw.—Speer & Dow of Fort Smith, Ark., have, it is reported, purchased \$42,500 of light and water plant bonds.

Okla., Oklahoma City.—Reported voted: \$250,000 of park and \$100,000 of water-works bonds.

Okla., Tulsa.—Regarding reported sale of \$666,000 of Tulsa county road-improvement bonds, an official letter says: "Bonds not sold yet; contract pending for sale."

S. C., Columbia.—Official: An election is to be held in April to vote on \$100,000 of water and light plant bonds. S. F. Brasington is Mayor and J. J. Goodale City Clerk and Treasurer.

S. C., Columbia.—Bids will be received

[For Additional Financial News, See Pages 76 and 77.]

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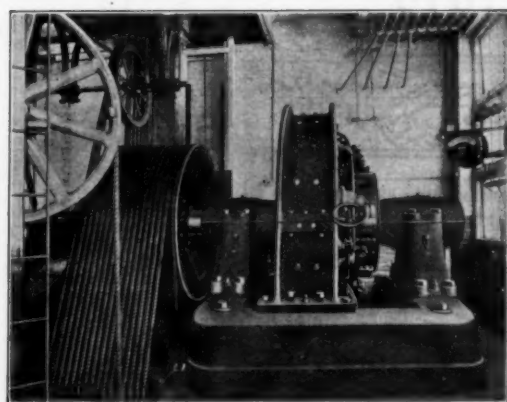
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SAVANNAH, GA.
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References—Any Bank in Savannah

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OF BALTIMORE

CAPITAL - \$1,500,000.00 SURPLUS - \$3,000,000.00

until February 21, inclusive, by D. G. Ellison, treasurer State Agricultural and Mechanical Society of South Carolina, 1207 Hampton St., for \$25,000 of 6 per cent. first mortgage bonds of the State Agricultural and Mechanical Society of South Carolina; denomination \$500.

Tenn., Nashville.—Press dispatches state that the City Council has passed bills providing for an election April 27 to vote on \$150,000 of street and bridge and \$300,000 of market-house improvement bonds.

Tenn., Rockwood.—Official: Bids will be received until 10 A. M. March 16 for \$15,000 of 5 per cent. 20-year school bonds. Denomination \$1000. Dated March 1, 1912; maturity 20 years. Address Bond Committee, J. E. Fox, chairman.

Tex., Alamo Heights, P. O. San Antonio.—Reported that the \$25,000 of 5 per cent. 20-year bonds of school district No. 48, voted October 10, 1911, are to be issued.

Tex., Austin.—The State Board of Education is reported to have purchased the following 5 per cent. bonds: Marlin high school, \$1000; Bonham high school, \$10,000; Kyle independent school district, \$2000; Silvertown common school district, \$6000; Garza common school district, \$3000, and San Marcos independent school district, \$2000; \$10,000 of 5 per cent. 20-40-year Longview water-works bonds; \$27,000 of 5 per cent. 20-40-year Paducah water-works bonds; \$3000 of 5 per cent. 20-40-year Prosper independent school district bonds.

Tex., Beaumont.—Reported that bids will be received until 10 A. M. April 4 by J. G. Sutton, City Secretary, for \$60,000 of street-improvement, \$60,000 of park and \$30,000 of sewer 5 per cent. 20-40-year bonds; denomination \$1000; dated April 1, 1912; maturity April 1, 1932.

Tex., Beaumont.—Reported that an election is to be held in Helbig school district, Jefferson county, to vote on \$25,000 of school bonds.

Tex., Berclair.—Press dispatches state that an election will probably be held to vote on school bonds.

Tex., Brownwood.—The United States Bond & Mortgage Co. of Dallas, Tex., is reported to have been awarded \$15,000 of water-works bonds. The price was a little above par.

Tex., Carlsbad.—An election is to be held, it is reported, to vote on school bonds.

Tex., Cleburne.—The Harris Trust & Savings Bank, Chicago, is reported to have purchased at \$41,500.40 and accrued interest \$178,000 of water-works bonds.

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LEWIS NEILSON,
Secretary.

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The only automobile that in itself performs all the labor of Electric Self-Starting, Electric Lighting and Ignition; Tire Pumping and the Automatic Regulation of Fuel Consumption.

Model 40, Touring Car, \$2400—fully equipped

A powerful Gasoline Car a woman can use.
Completely equipped at the listed price.
Motoring now pure pleasure—no work.

Model 40, 40 H. P. 5 passenger, Touring Car - - - - - Model 41, 40 H. P. 4 passenger, Demi-Tonneau - - - - - Model 42, 40 H. P. Roadster - - - - -	\$2400	Model 51, 7 passenger, 50 H. P. Touring Car - - - - - Model 51, 4 passenger, 50 H. P. Demi-Tonneau - - - - - Model 52, 50 H. P. Roadster - - - - -	\$3400
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We make two moderate price Inter-State quality cars:
 Model 30-A, Fore Door, 40 H. P., 5 passenger Touring Car, \$1750
 Model 32-B, 40 H. P. Roadster - - - - - 1700

Inter-State Automobile Co., Muncie, Ind.

Department X

WRITE FOR ART CATALOG GIVING FULL INFORMATION

• KANSAS • DAKOTA • ALABAMA • NEBRASKA • IDAHO •

• COLORADO • WISCONSIN • OREGON • CALIFORNIA • MISSOURI • GEORGIA • MINNESOTA • RHODE ISLAND • OHIO • UTAH •

Tex., Dallas.—Reported that an election is to be held in April to vote on \$600,000 of school bonds.

Tex., Denton.—Official: Bids are now being received for \$75,000 of bonds of Road District No. 1, Denton county. Address John Sparks.

Tex., Flint.—Bids will be received by Jesse P. Odum, district clerk, it is reported, until April 1 for \$9000 of 5 per cent. 40-year district No. 18 school building bonds; denomination \$100.

Tex., Mineral Wells.—An election is soon to be held in Palo Pinto county, it is reported, to vote on \$100,000 of road bonds of Precinct No. 1.

Tex., Pearland.—Reported that an election is to be held in Pearland District No. 1 to vote on \$12,000 of school bonds.

Tex., Franklin.—Reported defeated: \$25,000 of Robertson county bridge bonds.

Tex., Gainesville.—Reported that the Commissioners' Court of Gainesville is considering the offer of a Chicago firm for the purchase of \$100,000 of road bonds of Precinct No. 1, Cooke county.

Tex., Orange.—Spitzer-Rorick Company,

Toledo, O., is reported to have purchased \$200,000 of Orange county road bonds.

Tex., Port Arthur.—Official: March 12 an election is to be held to vote on \$35,000 of 5 per cent. 40-year independent school district bonds; denomination \$500. Address J. H. Bright.

Tex., Sherman.—The Grayson County Commissioners' Court, according to press dispatches, has entered an order for the issuing of \$400,000 of road bonds of District No. 2. W. R. Wallace is County Auditor.

Tex., Taylor.—An election is to be ordered, it is reported, to vote on \$35,000 of street-paving bonds.

Tex., Texarkana.—A special election is to be held, it is reported, to vote on bonds of sewer system improvement district No. 2, constituting Rose Hill section of the city.

Tex., Water Valley.—Reported that an election is to be held to vote on school bonds.

Tex., Waxahachie.—March 8, it is reported, an election is to be held in Ellis county to vote on \$335 of district school bonds.

Va., Petersburg.—The Board of Aldermen is reported to have adopted a resolution

favoring the issuing of \$300,000 of public improvement bonds, and it is stated an election will probably be held in June.

Tex., San Benito.—March 9, it is reported, an election is to be held to vote on \$48,000 of street-improvement and sewerage bonds.

At Newbern, N. C., bids will be received until 10 A. M. March 4 for \$10,000 of 5 per cent. Craven county refunding bonds. Further particulars will be found in the advertising columns.

At Murphy, N. C., bids will be received on the first Monday in April for from \$50,000 to \$100,000 of 30-year township bonds; interest at 5 and 6 per cent. Further particulars will be found in the advertising columns.

At Corinth, Miss., bids will be received and opened at 2 P. M. March 7 for \$11,500 of 5 per cent. 10-year Alcorn county jail bonds. Further particulars will be found in the advertising columns.

At Union Springs, Ala., bids will be received until 8 P. M. March 7 for \$30,000 of sewerage and \$5000 of water-tower bonds. Further particulars will be found in the advertising columns.

FINANCIAL NOTES.

The Bank of Tryon, at Tryon, N. C., proposes, it is stated, to increase its capital from \$10,000 to \$25,000.

The National Bank of Savannah, Ga., is reported to have decided to increase its capital to \$400,000 from \$250,000.

The Merchants' State Bank of Port Arthur, Tex., it is reported, increased its capital stock from \$25,000 to \$50,000.

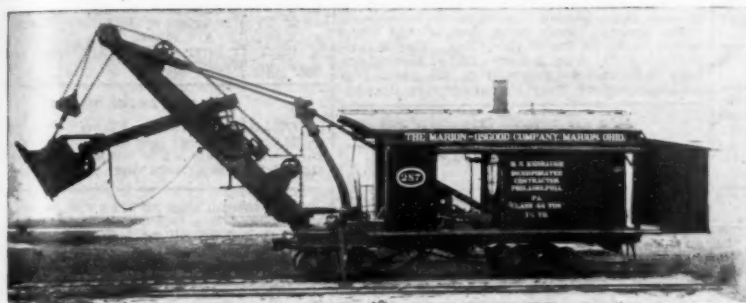
The Real Estate Bank & Trust Co. of Savannah, Ga., will, it is stated, increase its capital from \$150,000 to \$300,000.

The Maryland Bankers' Association will hold its annual convention at the Blue Mountain House June 20, 21 and 22.

The Commercial Bank of Bogalusa, according to press dispatches, has absorbed the Bank of Bogalusa, and will increase its capital from \$25,000 to \$50,000.

According to press dispatches, the Bank of Adams and a proposed new bank also for Adams, Tenn., have been consolidated under the name of the old bank with capital of \$20,000. Dr. J. R. Cornwell is president.

THE MARION-OSGOOD COMPANY, Marion, Ohio, U. S. A.

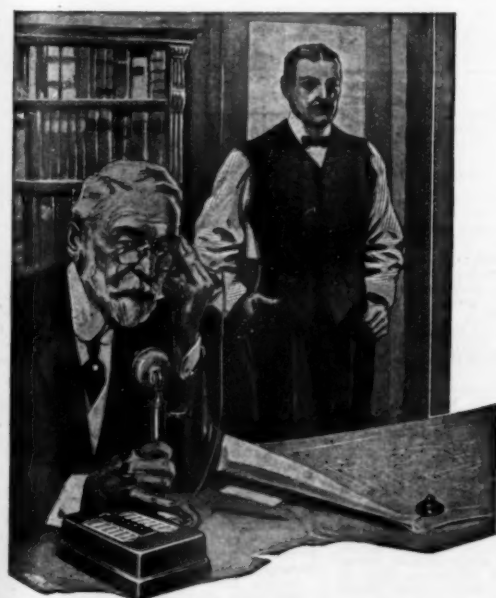


STEAM SHOVELS, DREDGES, BALLAST UNLOADERS, All Sizes

Managers races and piers
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Managers dipper front
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EQUIPMENT FOR EVERY ELECTRICAL NEED

"SAVE TIME AND FREIGHT"



"TELEPHONE OUR NEAREST HOUSE"



Classified Opportunities

MEN WANTED

HIGH-GRADE SALESMEN having acquaintance among large manufacturers will bear of side line paying liberal commission; no samples required. Address "Allen," Box 663, Cincinnati, Ohio.

WANTED—The country or local men; all sections of the country; profitable side line; commission or salary; good men average \$100 weekly. For particulars address The Sun Chemical Company, Richmond, Va.

GOOD LINE WITH LESS COMPETITION. Selling standard medical books to physicians is profitable and agreeable work. It develops a high grade of salesmanship. Address Dept. R. F. A. Davis Co., 1914 Cherry St., Phila., Pa.

WANTED—A live and hustling man in each State for our general agent to sell county rights and appoint agents to sell "The World's Best" Crude and Kerosene Oil Burner. This burner burns crude, kerosene and gasoline in any cookstove or heater without soot or smoke. Its heating capacity is wonderful and is 50 per cent. cheaper than wood or coal. Guaranteed non-explosive. You cannot explode it. Do not waste time in writing. Send good reference with your first letter. None but good men wanted. Salary, \$150 and expenses, or a commission. Sit down now and answer and get your sample. Eunice Carriage and Machine Shops, A. D. Marcotte, manager, Eunice, La.

AGENCIES WANTED

AGENCY WANTED for large corporations or capitalists who wish to invest in lands in Mississippi. P. M. Woodall, Box No. 74, Coffeeville, Miss.

YOUNG MAN, 23 years of age, best of references, desires position with a good concern, handling agency office or traveling; 5 years' experience in wire-fence business; fence line preferred. Address No. 956, care Manufacturers Record.

YOUNG MAN with technical education and over five years' experience in manufacturing and selling a line of light industrial cars and trucks for all purposes, with established trade and office in Southern territory, desires to represent manufacturers of lines requiring similar experience. Particularly desirous of connection with makers of reliable auto trucks, tractors, handling systems and appliances. Thoroughly capable of handling and getting high-class business. Address No. 957, care Manufacturers Record.

PROGRESSIVE, established agents contractors' equipment and supplies desire agencies for metal lath, sidewalk lights, skylights, medium steel reinforcing, etc., for Virginia. Only good lines wanted. Make us proposition. Address No. 959, care Manufacturers Record.

SITUATIONS WANTED

AM thoroughly experienced in corporation accounting, systematizing, cost and statistical work; desire position as office manager or accountant; best references. Address No. 946, care Manufacturers Record.

SITUATION WANTED by Cornell graduate having nine years' experience in manufacturing and jobbing business; want position with established company where there is chance of advancement if ability is shown; am willing to start at moderate salary. Address No. 924, care Manufacturers Record.

WANTED—Position by young man of university education with three and one-half years' practical experience in road and bridge work; location immaterial; salary sufficient to live decently; no bad habits. Address No. 952, care Manufacturers Record.

HIGHWAY ENGINEER, 17 years' experience, will be open for engagement about March 15; macadam, gravel and sand-clay roads a specialty; or will act in a consulting capacity, making examinations of materials, surveys, plans and specifications; New York State experience. Address No. 958, care Manufacturers Record.

WANTED—By responsible and practical man, position as building superintendent; would like to get with high-class contractor doing large work. Do not answer unless sober, energetic hustler is needed. Would leave salary to question of results obtained. Would prefer to work for salary and percent. of net profits. Reference furnished. Address No. 950, care Manufacturers Record.

YOUNG MAN, 23 years of age, of a good moral, upright character, wishes position with a good concern; handling agency office or traveling in the South preferred; possessed of that personality and business tact that succeeds at anything; have a good knowledge of Hardware, builders' material and furniture; have the very best of references. Address P. O. Box 296, Valdosta, Ga.

EDUCATIONAL

RENSSELAER POLYTECHNIC INSTITUTE, TROY, N. Y.—Courses in Civil, Mechanical and Electrical Engineering, and General Science, leading to the degree of Civil Engineer (C.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E.), and Bachelor of Science (B.S.). Special courses in engineering and science. Splendidly equipped new engineering laboratories. Send for catalogues to Registrar.

Rate 20 cents per line per insertion. Minimum space accepted, four lines. Maximum space accepted, 24 lines. Allow seven words per line. Terms: Invariably cash with order; check, postoffice or express order or stamps accepted. No display type used. Questionable or undesirable advertisements will not be accepted. The assistance of our readers in excluding undesirable advertisements is requested. We reserve the right to refuse any advertisement. No patent medicine, whiskey or mining stock advertisements accepted. Rate for special contracts covering space used as desired within one year, as follows: 100 lines, 18c. per line; 300 lines 16c. per line; 500 lines or more, 15c. per line.

ENGINEERING AND CONTRACTING

MUNICIPAL ENGINEER AND CONTRACTOR—Paving, sewerage, waterworks, sewalls, bridges and reinforced concrete work. When in need of an experienced engineer or contractor for such work, address W. B. Williams, St. Petersburg, Fla.

BANKS

THE PALMETTO NATIONAL BANK, Columbia, S. C., capital \$250,000, solicits accounts of banks, firms, corporations and individuals, either commercial or savings accounts.

FLORIDA HOTELS

THE WINDSOR HOTEL, Jacksonville's finest and Florida's largest and best year-round hotel. Rates reasonable. American and European plan. Operating the finest European grillroom in the South. Thomas M. Wilson, proprietor.

CAPITAL WANTED

MANUFACTURING CONCERN with established business wants \$50,000 additional capital; would not object to working partner; situated in mountains of North Carolina; ideal climate and situation. Address No. 954, care Manufacturers Record.

BUSINESS OPPORTUNITIES

WANTED—Man or men with practical experience to establish woodworking plant to manufacture novelties. To such men will give assistance. Plenty of cheap timber, good transportation facilities and natural gas for fuel. Address Secretary, Box 67, Poteau, Oklahoma.

ABSTRACTS OF TITLE a specialty. Loans negotiated. Real Estate Title Co., New Martinsville, W. Va.

WANTED—Building supply houses to handle agency for high-class building directory boards; complete line at attractive prices. Write for terms, giving references. The Directory Board Co., Rochester, N. Y.

CORPORATIONS ORGANIZED—CAPITAL NEGOTIATED—For firms who desire additional capital to increase their business. Will contract to sell issue of stock or bonds of any legitimate business enterprise, either developed or undeveloped. Clifford R. Skinner, Fidelity Building, Philadelphia, Pa.

WANTED—PARTNER—I am looking for location with party having established real estate business in the coal fields of Alabama or Tennessee; experience in coal mining and coal fields; best of references. Write, giving terms, etc., No. 950, care Manufacturers Record.

WANTED—To lease small coal mine in Tennessee or Alabama, or would take interest with owner or buy on terms; several years of coal mining experience; best of references. Address No. 949, care Manufacturers Record.

TO A PRACTICAL HANDLE MAN, who is well recommended, we will sell on such easy terms that he can pay for it from the earnings of the plant, an up-to-date plant for making hickory tool handles, singletrees, neckyokes, broom handles; well equipped with an abundant supply of available timber. Address No. 899, care Manufacturers Record.

WANTED—Associate with \$30,000 to \$40,000 to invest in a modern and very profitable hardwood-working plant in Northern Alabama; money wanted to increase business and buy timber land; can be bought cheap; can realize first cost on land after removal of timber; will prove money-maker to right party; plant practically new, in operation little over year and making money; splendid railroad facilities; healthy; delightful climate; will bear fullest investigation. For particulars address No. 948, care Manufacturers Record.

WE PROMOTE TOWN LOT SALES—Land owners adjoining thriving cities, cut your acreage up into town lots, employ us to conduct a red-tag sale. We'll take the lots to the mint and coin them into money for you. Owners, write for particulars. F. J. Raymond Realty Co., Evansville, Ind.

WINTER HOMES FOR SALE

FLORIDA winter home and celery farm, 10 acres, subirrigated, facing St. Johns River; finest fishing and shooting; beautiful bungalow, surrounded by orange trees. Address Cecil Gabbett, Sanford, Florida.

MAPS AND BLUE PRINTS

MAPS OF TEXAS COUNTIES—We make blueprint maps of nearly all Texas counties and several Louisiana parishes. Write for prices on those desired. Singleton Bryan & Co., Beaumont, Texas.

TYPEWRITERS

IF YOU are interested in purchasing a high-grade typewriter and do not care to invest \$100 asked by the manufacturers, we would like you to investigate our remanufactured machines. Three days' trial allowed. Enterprise Exchange, Inc., 609 E. Baltimore street, Baltimore, Md.

NEW LOCATION WANTED

A THOROUGHLY EQUIPPED COTTON-GLOVE FACTORY doing an active business, at present located in a large Northern city, desires a new location where—

First—At least 100 girls for machine operators can be secured.

Second—Proximity to cotton mills and good shipping facilities.

Third—Where one or more men can be interested, to manage the business and finances, who can secure \$10,000 or \$15,000 to enlarge the business.

The present owner is in professional work which occupies his entire time. The manufacturing is managed by an expert glove man, who can be retained at \$25 per week. Address No. 951, care Manufacturers Record.

INDUSTRIES WANTED

OVERALL AND SHIRT FACTORY

WE WANT to get in touch with some party for the establishment of an overall and shirt factory at Fowlerton, Texas; will subscribe for part of the stock and also be liberal as to bonuses. Fowler Bros. Land Co., Fowlerton, Texas.

CREAMERY

CREAMERY imperatively needed at Norfolk, Va., where lands, price, demand, importations, health requirements, climate and other conditions offer unsurpassed advantages. Write for details to Jordan & Davis Company, Norfolk, Va.

MISCELLANEOUS

WANTED—Men with capital to take active working interest in existing enterprises in Asheville and to establish new industries here; good locations for woodworking plants, especially stove mills. Write quick. Board of Trade, Asheville, North Carolina.

VICTORIA, TEXAS, head of navigation of Guadalupe River; center of cotton, corn, truck and citrus fruit-growing district of South Texas; country rapidly developing; opportunities for many industries. If interested in the coastal section of Texas, write for booklet "D" to the Secretary of the Progressive League.

SUFFOLK—The best manufacturing and distributing point in Virginia; six railroads and water transportation; plenty of labor; cheap fuel; electric power; seventy manufacturing plants in successful operation; opportunity for furniture and woodworking plants and any wholesale jobbing or manufacturing business; center of tidewater; richest farming section to be found; healthy; excellent schools and churches; filtered water, gas and sewer. Write Board of Trade, Suffolk, Va.

WHAT CAN YOU DO? What can you make? No matter what it is, you can do it better in Spartanburg and make it better in Spartanburg, because Spartanburg will help. Best distributing point in the South. Alive with opportunities. If you mean business, address Chamber of Commerce, Spartanburg, S. C.

CLEVELAND, TENN. WANTS YOU—The best town in the Southeast, with a hydro-electric development of 32,000 initial horsepower for manufacturing purposes, final development 32,000 horse-power. Free manufacturing sites; exemption from city and county taxes; ample railroad facilities; spring water pumped to all parts of the city; cheap raw materials; 136 miles of pike roads in county; fine farming and trucking section; best of public utilities; cheap white labor; cheap power; ideal location for cotton mill, furniture factory and brick-manufacturing plant; good climate; most rapidly developing city in the Southeast. Write Commercial Club, Cleveland, Tennessee.

INDUSTRIAL PLANTS FOR SALE

FURNITURE AND WOODWORKING PLANT

\$40,000—COMPLETE new furniture, show-case and woodworking plant on sidings of two railway systems, Texas town of 6500 people; good market; material convenient; water free; fuel inexpensive; thoroughly modern plant, ready for immediate operation. Oliver & Remy, San Marcos, Texas.

HANDLE AND SINGLETREE PLANT

FOR SALE—Handle and singletree plant, well equipped, where there is an abundance of available timber to last for many years. Address No. 900, care Manufacturers Record.

ELECTRIC LIGHT PLANT

FOR SALE AT A BARGAIN—Complete equipment of an electric-light plant, consisting of one 14336 mill type Murray Corliss engine, 2 85 H. P. Atlas tubular boilers, 1 Gen City heater, 3 boiler-feed pumps, smoke stacks and settings, 1 90 K. W. single-phase A. C. generator, skeleton switchboard and instruments. Will sell all or any part. Fire prices and description address City Light and Water Plant, Coleman, Texas.

CEMENT BLOCK PLANT

CEMENT-BLOCK PLANT—\$2500 equipment, \$1500 stock, \$5000 plot of ground; two blocks from center of most rapid growing city in Georgia; business paying from \$3000 to \$3500 per year; will sell for \$8000; \$3000 cash; balance time. Address Box 666, Fitzgerald, Ga.

FACTORY OR WAREHOUSE BUILDING

FOR SALE OR FOR RENT—At New Orleans, La., one square of ground, 330'x420', with one-story brick slate-roofed sheds on four sides, with open shelved court yard; Illinois Central switch track privilege; paved street; electric car line; near river and belt railroad; ideal site for factory, warehouse; ready for occupancy. Apply T. B. Lynd, 411 Hibernia Bldg., New Orleans, La.

STAVE AND HEADING PLANT

FOR SALE—Stave and heading plant; capacity, ninety thousand tight staves per week, or ninety sets of slack heading per week. Five to seven million feet of gum gum with plant. Abundance of gum timber can be had. If interested, write A. M. Dumay, Receiver, Washington, N. C.

ROTARY VENEER PLANT

ROTARY VENEER PLANT, completely equipped with best Coe machinery and dryer, for sale or lease at a big bargain. Address Geo. A. Murray, Asheville, N. C.

BRICK AND POTTERY PLANT

FIRE BRICK PLANT FOR SALE—Brick plant consists of manufacturing capacity 20,000 daily, with pottery capacity of 200 gallons capacity daily, and a bank of the best fire clay that can be had, consisting of six acres ranging from ten to forty feet deep; one building 55x100 feet, one building 40x50 feet. Address No. 955, care Manufacturers Record.

BRICK PLANT

FOR SALE—Complete soft mud brickmaking plant, including complete car system for handling brick. For particulars write A. M. Kahn, secretary, Bolivar, Tenn.

FOR SALE—Modern brick manufacturing plant; fully equipped in every respect; 15 acres clay; junction two trunk-line railroads; river transportation; 25,000 daily capacity; going business; million bricks in stock; strong demand; excellent reason for selling; bargain. H. A. Mann, Evansville, Ind.

BARREL AND CRATE FACTORY

LARGE BARREL AND CRATE FACTORY, heart of trucking section; will net \$15,000 yearly; business unlimited; direct with farmers. F. A. Clark, Mathews C. H., Va.

TRIM AND FLOORING PLANT

FOR SALE—Hardwood trim and flooring plant; two railroads; good buildings and shipping facilities; now showing fifty dollar profit daily; sickness reason for selling. For particulars write Hibbard Realty Company, Staunton, Va.

SAWMILL PLANT

IN AN EFFORT to protect my company's claim about a year ago, I became interested in the sawmill business; but as I know nothing of this, I desire to sell it, and offer the following at considerable sacrifice:

35,000,000 ft. pine (Brayton's estimate) at \$3.00.....	\$105,000.00
10 miles railroad.....	30,000.00
2 locomotives.....	5,000.00
25 mules, carts and harness at \$200.00.....	5,000.00
10 trucks.....	1,000.00
Sawmill, planing mill, drykilns, location and building (30 acres), cost over \$65,000.00.....	60,000.00
	\$195,000.00

Mill capacity, 50,000 daily. Price, \$125,000.00. Terms: \$25,000.00 cash; balance monthly payments on basis of \$4.00 per 1 M. feet cut. Minimum, \$2500.00 each month. More than 75,000,000 feet pine available in addition to and adjoining our timber, at reasonable price. R. V. Covington, President Covington Company, Jacksonville, Fla.

CRACKER FACTORY

FOR SALE—CRACKER FACTORY—COMPLETE—We offer for sale, at a bargain, complete cracker factory, machinery and equipment. Correspondence or personal inspection solicited. The First State Bank & Trust Co., Abilene, Texas.

LAND WANTED

WANTED—Tracts of land suitable for planting; must be desirable location and attractive; cities of 5000 or under preferred; correspondence solicited. The American Land Co., Evansville, Ind.

Classified Opportunities

MINERAL AND TIMBER LANDS, WATER POWERS AND MISCELLANEOUS PROPERTIES

NEW ORLEANS residence lots and factory sites; Louisiana mineral, timber, cut-over and farm lands. Orient Co., Ltd., 513 Audubon Bldg., New Orleans, Louisiana.

RELIABLE, accurate and definite information regarding the possibilities for investment in high-grade land propositions in Mississippi and Louisiana; fourteen years' successful operation; references exchanged. Walter G. Hodges, Meridian, Miss.

FOR SALE OR EXCHANGE—14 lots, 25x140 feet, on Shades Mountain, 6 1/2 miles from center of Birmingham; all held at \$700; will exchange for cut-over or other low-priced acreage. R. P. McNally, Owner, 306 Title Guaranty Bldg., Birmingham, Alabama.

FOR SALE—1400-acre tract of land, suitable for town site and small truck farms, located on trunk-line railroad and in 30 miles of Birmingham, Ala., the best truck market in the South. Price \$12.50 per acre; one-fourth cash; balance easy; or might use good stocks or bonds in lieu of cash payment. Address No. 944, care Manufacturers Record.

FOR SALE—Boundary of 256,000 acres in State of Durango, Mexico; good ranch, mineral and timber land; contains 500,000 feet yellow pine; railway building within 25 miles of land; 25-mile tramway to new railway can be built at small cost; 100 miles to Pacific port of entry by rail, for ship-loading for use of Panama Canal route and for all American and European shipping markets. We control and can deliver promptly this valuable boundary for \$2.50 per acre; one-fourth down; one, two and three years for balance. Principals only need reply. Address for particulars, J. C. Lindley, Greensboro, N. C.

BEFORE YOU BUY LAND or make an investment in the South or Southwest send for a copy of my "Investor and Land Buyer" with list of splendid properties for sale; free on application. Jo A. Parker, Parma, Mo.

MINERAL AND COLONIZATION LANDS. Hundred thousand acres, Texas, \$1.10 per acre. Colonization tracts, Florida, \$3 to \$15.00. Seventy thousand acres virgin timber, including 215 crops turpentine, in Florida, \$1 in fee. One million acres northern Mexico, of which 400,000 are coal lands, 600,000 are Best corundum and garnet proposition in America. All bargains. Power & Brooks, Montgomery, Ala.

MINERAL, TIMBER AND FARM PROPERTIES.—High-grade brown hematite and lignite, large tracts of hardwood and pine timber, manufacturing sites, and farms to suit all who are looking for a good home or investment; in the best climate and seasons, and social, educational and religious advantages; in Virginia, the best resident state of the Union. Write for information to International Farm Agency, Lynchburg, Va.

WE HAVE FOR SALE in fee delivery 50,000 acres coal and mineral lands, located in the heart of rich coal and mineral belt of East Tennessee, bordered on two sides by railways; lands lay best for easy and low cost of operating of any old settled good title lands; labor can be had in abundance, and reasonable average of 12,000 tons of good domestic and coke-making coal to the acre. Present owners own and have owned the fee in these lands for 18 years. Taxes paid and absolutely no squatters. Owners live near property. They will commence the abstracting when actual buyers of standing arrive on lands and commence inspection, making deposit in escrow in local bank of one-fourth purchase price pending approval. Price \$18.50 per acre; one-fourth down; balance 1, 2 and 3 years. Address J. C. Lindley, Greensboro, N. C.

ONE of the finest land and timber propositions in Arkansas; 3170 acres; 2860 fine hardwood timber, estimated to cut 6,000,000 feet; 330 in cultivation; located on two railroads; contains new sawmill and buildings for all necessary labor; will bring nice income from the start; quick action gets a bargain. John F. Nieman, Woodville, Ohio.

TIMBER, COAL AND MINERAL LAND WANTED. WANTED—TIMBER, COAL, MINERAL LANDS, developed or undeveloped. Negotiations desired direct with principals. No brokers. Box 152, Philadelphia, Pa.

COAL LANDS FOR SALE. 4400 ACRES OF COAL LAND in Kentucky for sale; in sight of railroad; deal direct with purchaser. Apply at once. W. H. Tompkins, Bristol, Tenn.

ILLINOIS COAL LANDS FOR SALE.—I own and control 19,000 acres coal mining rights, State Illinois, 80 miles from St. Louis, 60 miles from Mississippi River; 8-foot vein; rock roof; low price. Opening Panama Canal will create large demand for steam coal; can be delivered by barge at lower cost transportation than from any other field. H. White, 109 N. 7th St., St. Louis, Mo.

COAL MINE FOR SALE. **FOR SALE OR LEASE**—Fairmont gas coal mine; 100 acres; eight-foot seam clean, hard and lumpy; fully equipped; now shipping two hundred tons daily; all improvements; non-union district; reasonable terms. Address No. 961, care Manufacturers Record.

COAL AND TIMBER LANDS

COAL AND TIMBER LANDS FOR SALE. 2000 acres of coal and timber lands in Letcher county, Kentucky, in one tract, underlain with fifteen veins of coal, ranging from two to ten feet thick; in all, about 93 feet of coal in one mountain, the first vein at base of mountain seven feet thick.

Also, about 10,000 acres, about one-half in fee, and the other coal and mineral; 2000 acres of this on headwaters of Kentucky river, all carrying the big Elkhorn seam of coal, as well as other seams.

The extension of the L. & E. Railroad, from Jackson, Ky., to the head of Elkhorn, runs through part of these lands and nearby the remainder. For further particulars as to prices, etc., call on or address J. H. Frazier, Whitesburg, Ky.

TIMBER FOR SALE

FIFTY MILLION FEET of long and short leaf standing pine timber for sale; fine logging proposition. Address E. A. Hawes, Jr., Atkinson, N. C.

FOR SALE—40,000,000 feet of first-class hardwood and cypress, situated right on a railroad. Apply to E. J. Iles, Alexandria, La.

DOGWOOD BLOCKS WANTED

WANTED—To buy dogwood blocks for cash. H. B. Worth, Greensboro, N. C.

TIMBER LAND FOR SALE

FOLLOWING round timber in Florida: 13,500 acres, De Soto county, at \$7.50 acre; fee simple; warranty deeds; third cash; balance one, two years at 6 per cent. 50,000 acres, Osceola county, at \$10.50 acre; fee simple; warranty deed; \$100,000 cash; balance easy terms at 6 per cent. Numerous other offerings. Write us. Marcus E. Sperry & Co., Tampa, Fla.

FOR SALE—7000 acres timber land on the tributaries of Elk River in Webster and Braxton counties, West Virginia.

Timber is two to four miles from B. & O. R. R., and entire tract drains toward railroad. All in one compact body. About 2500 acres is absolutely virgin.

The principal kinds of timber are poplar, oak, ash, hickory, chestnut, walnut, beech, sugar, birch and basswood, all the finest quality. Poplar unusually large and fine. At least 30,000 telegraph or telephone poles and 50,000 railroad ties, and many other by-products. Timber can be taken from the stump to B. & O. siding at \$10 per M. Conservative estimates of the timber show about 35,000,000 feet. Price, \$18 per acre.

We deal in West Virginia coal lands, timber lands, orchards and orchard lands, oil and gas lands, leases, royalties and production. If interested in any kind of a land investment in West Virginia from \$1000 to \$1,000,000, write West Virginia Tri-Products Co., Howard L. Swisher, Pres., Morgantown, W. Va.

CUT-OVER LANDS

CUT-OVER TIMBER TRACTS. 50,000 acres cut-over pine lands, Miss., \$6.50. 30,000 acres cut-over pine lands, La., 6.00. 75,000 acres cut-over pine lands, Tex., 5.00. 18,000 acres cut-over hardwoods, La., 4.50. Marsh Lands for Reclamation. 60,000 acres in a body, Gulf Coast of La. 3.00. Timber Lands. 20,000 acres L. L. Y. pine, Fla., cut \$500 ft. 7.00. 15,000 acres L. L. Y. pine, Ala., cut 7000 ft. 21.00. 30,000 acres hardwood, cut 10,000 ft. (60% red gum), 10.00. Finest red gum proposition South. Wm. R. Taylor, 508 Perrin Bldg., New Orleans, La.

COLONIZATION LANDS

BUY DIRECT FROM OWNER.—Am offering 1463-acre tract of choice farming land in Louisiana, located 125 miles from New Orleans on Texas Pacific Railway, one mile from station, and six miles from town on another railroad; one-half cleared (nearly all fresh land), balance in timber. This is all the richest alluvial deposit, soil black sandy loam, no finer land on earth; especially adapted for corn, sugar-cane, cotton, alfalfa, etc.; 600 bales cotton were raised on this farm year before boll-weevil appearance (exceeding 1 1/2 bales per acre); 30 cabins; a fine colonization proposition; all well drained; no waste land. For quick sale, \$25 per acre; one-third cash; balance one and two years at 6 per cent.; title perfect, and immediate possession. E. E. Woodcock, 1716 Milan St., New Orleans, La.

MARSH LAND

6000 ACRES WET LANDS in one body, 35 miles from New Orleans, in St. Bernard parish. Lands now being reclaimed.

North, south and west of this property selling \$80 to \$100 per acre after reclaiming. This is the last and only tract of desirable marsh land to be obtained at the old level of prices in this most progressive section of Louisiana.

Directly in zone of the Frisco Railroad's new development projects. For immediate sale, until further notice, this 6000-acre tract is quoted at \$3.00 per acre net.

Complete information will be given by wire to live inquiries. N. J. Ciesl, 321 Gravier St., New Orleans, La.

FARM AND TIMBER LANDS

BARGAINS in small farms, level land, some timber with improvements on each; 40 to 1300 acres; near shipping point and other advantages. Write Lee H. Bird, Oma, Miss.

FARM AND TIMBER LANDS.—We have attractive offerings in farm, yellow pine and hardwood timber lands. We also handle coal and ore properties. Correspondence from interested parties invited. Provident Trust & Security Co., Land Dept., Walton Bldg., Atlanta, Ga.

I HAVE BARGAINS IN TIMBER TRACTS. large colonization propositions, cut-over lands and reclamation tracts in any size wanted up to 150,000 acres from \$2.50 per acre up.

Wm. R. Taylor, Land and Timber Investments, 508 Perrin Building, New Orleans, La. Established 1898. Sales over \$6,000,000.

PLANTATIONS FOR SALE

3555 ACRES of good hill cotton land for sale; now in successful operation; well supplied with negro labor. The plantation lies between two branches of the Illinois Central Railroad; nearest shipping point, four miles from the dwelling. The land corners within half mile of one of the shipping points. A sufficiency of cabins for tenants, stables, cribs, cotton pens and all outhouses. Forty-five head of mules and horses, cows, farming implements and feedstuff. Price very low. Terms good. Address A. C. Leigh, Grenada, Miss., bona-fide owner of the property.

FARMING LANDS

WE OWN and offer for sale on easy terms more than 100,000 acres of farming lands in Louisiana and Mississippi. Anyone interested in Southern investments should write us direct and save the middleman's profit. The Lampton Realty Co., 405 Hibernia Bank Building, New Orleans, Louisiana.

FARM AND RANCH LANDS

90,000 acres Durango,	price \$1.75 per acre
80,000 acres Coahuila,	price 2.25 per acre
80,253 acres Chihuahua,	price 3.00 per acre
100,000 acres Sonora,	price 3.00 per acre
375,300 acres Durango,	price 3.00 per acre
162,783 acres Chihuahua,	price 2.00 per acre
125,147 acres Durango,	price 2.00 per acre
230,000 acres Coahuila,	price 1.50 per acre
3,500,000 acres Chihuahua,	price 2.50 per acre
405,000 acres Chihuahua,	price 2.00 per acre
30,690 acres Tamaulipas,	price 3.50 per acre
70,000 acres Chihuahua,	price 1.50 per acre
28,000 acres Chihuahua,	price 3.50 per acre
103,355 acres Tamaulipas,	price 2.25 per acre
179,645 acres Tamaulipas,	price 2.25 per acre
90,250 acres Coahuila,	price 2.75 per acre
1,115,640 acres Tamaulipas,	price 2.50 per acre
1,396,385 acres Sonora,	price .75 per acre
191,000 acres Sonora,	price .75 per acre
60,000 acres Durango,	price 4.50 per acre
200,000 acres Durango,	price 2.00 per acre
100,000 acres Sinaloa,	price 5.50 per acre

Cass & Fry, 30 City National Bank Building, El Paso, Texas.

PECAN ORCHARDS

VALDOSTA, GEORGIA, PECAN PLANTATIONS.—Pecan culture offers largest returns; five-acre tract on easy payments assures a steady growing income; we take care of orchards for four years; 800 acres under cultivation in budded paper-shell pecans. Write for booklet. South Georgia Real Estate & Development Co., Valdosta, Ga.

ORANGE GROVES

FOR SALE—Good orange and grapefruit grove; 14 acres timber land adjoining; 48 acres available land; good reason for selling. Address P. O. Box 94, Haines City, Fla.

FLORIDA ORANGE GROVE and home for sale; ideal location in most desirable part of State; grove in full bearing; bargain for quick sale. Write J. T. Fuller, Brooksville, Fla.

CHOICE location offering in Florida; forty acres; nineteen acres in twenty-six-year-old orange trees; one acre twelve-year grapefruit; excellent condition; product, four to six thousand boxes annually; west coast; two miles of Gulf; one mile main line railroad station; on hard road; near four good towns. Offered to wind up estate at fifteen thousand dollars; third cash; balance 6 per cent. Marcus E. Sperry & Co., Tampa, Fla.

FARM, FRUIT AND TRUCK LANDS

ALABAMA

FRUIT AND STOCK FARM.—900 acres of fine land, adapted to fruit, stock raising and general farming; 600 acres in cultivation; balance in fine timber, at least 2,000,000 feet; these lands are extra fertile; situated in Southwest Alabama, 2 1/2 miles of county-seat town; fine shipping facilities; abundance of good labor. Price, \$25 per acre, with a bond guarantee that this property will increase in value 100 per cent. in next ten years. The reason this property is offered for sale, have more lands than I can look after. Address Owner, Box 193, Orlando, Fla.

BUY FROM OWNER 54-acre farm; well improved; team, stock, grain, roughness; modern farm implements; poultry plant; all for \$200; worth \$3500. Thornhill's Poultry Farm, Hartselle, Ala.

FOR A HOME OR FOR INVESTMENT let us write you interestingly of more than 400,000 acres of desirable land which we have for sale at wonderfully low prices in Alabama. Any location, large or small farm, pasture and fruit lands. Picking out bargains throughout the State is our daily business. Alabama State Agricultural Land Co., Center, Ala.

ARKANSAS

FOR SALE—40-acre farm in Desha county, two miles from Dumas; 175 acres in cultivation; has six houses and rents for \$4 per acre. For further information address P. O. Box No. 248, Dumas, Ark.

FLORIDA

FLORIDA FARMS ARE FORTUNES.—Our soil similar to fertile sections Iowa, Minnesota; easy-payment plan. Write for booklet. Milton Land & Investment Co., Marianna, Fla.

20,000 ACRES "prairie" land in De Soto county; well located; good land; transportation facilities; five dollars acre; terms. Also have 6500-acre tract in Sumter county at six dollars. Other attractive listings. Write us. Marcus E. Sperry & Co., Tampa, Fla.

FOR SALE—Bargain; 3000 acres selected orange and grapefruit land in a body, Lake region of Polk county; best citrus section of Florida; heavy round timber; very high land; sold only as a whole. Address "Owner," P. O. Box 242, Tampa, Fla.

WRITE US for listings covering open and improved tracts of citrus and vegetable lands in all parts of Florida; many attractive offerings. Our specialty: Tampa and suburban property. Have an exceptionally fine subdivision proposition; platted and ready for market; forty acres; frontage on eighty-foot paved street; ten minutes from center of Tampa; listed with us exclusively at a bargain. Telegraph or write Sperry Land Company, 217 American National Bank Bldg., Tampa, Fla.

FLORIDA FRUIT AND TRUCK LANDS.

We offer 10-acre tracts in that part of the State of Florida lying in Hillsborough county and Lake Butler region, in the Pinellas peninsula, on the west coast of Florida, on the Gulf of Mexico; with its elevation and rolling hills is especially suited for fruits of all kinds—grapefruit, oranges, grapes, dates, figs, bananas, peaches and other fruits, as well as vegetables, potatoes, corn, beans, peanuts and all the varieties that can be produced anywhere. The Tarpon Springs district offers the most favorable conditions for farmer, home seeker and investor. Fertile land in small tracts, easy monthly payments; guaranteed title. Investigation invited. If you want a bargain and a home in the most desirable part of Florida, write now for particulars and reservation. Tampa & Tarpon Springs Land Co., Tampa, Florida.

LOUISIANA

HEADQUARTERS FOR NORTH LOUISIANA LANDS.—Large and small tracts, suitable for plantations, small farms, orchards or truck gardens. Climate, soil and health conditions here are unsurpassed. The staple crops of the North grow in this section alongside of cotton and cane. A great stock country. Write for particulars stating your requirements. References, my customers and any bank in Shreveport. W. A. Jones, Authority on North Louisiana Lands, Shreveport, La.

FORTY-ACRE TRUCK FARMS for sale in the famous strawberry belt of Louisiana; on main line of Illinois Central Railroad. Price \$25 per acre on easy terms. Similar lands only a few miles distant are selling as high as \$75 per acre. The Lampton Realty Co., 405 Hibernia Bank Building, New Orleans, Louisiana.

MISSISSIPPI

FORTY-ACRE FARMS in George county, Mississippi, 35 miles northwest of Mobile. This is one of the most-favored general farming sections of the entire South, and no better values can be found anywhere. Price \$25 per acre on easy terms. The Lampton Realty Co., 405 Hibernia Bank Building, New Orleans, Louisiana.

NORTH CAROLINA

WANTED—Men to become independent farmers in Eastern North Carolina, the "Nation's Garden Spot." Leads for large profits on small capital. Write for booklet. C. Van Leuven, 515 Southern Bldg., Wilmington, N. C.

OKLAHOMA

ALFALFA FARMS.—Two, 160 acres each, well-improved alfalfa farms at \$75 per acre. These are bargains and will sell soon. If interested, write A. McDaniel, Norman, Okla.

TEXAS

2464-ACRE FARM on Lavaca River, 5 miles north of Egan, Texas; 500 acres river bottom field; 10 small rent houses; one 10-room ranch house; private phone line out of Edna; all fenced; several wells; 3000 bearing pecan trees; will sell or trade for good city property at \$55 per acre. Emil Locke, 712 Gibbs Bldg., San Antonio, Texas.

FOR SALE BY OWNER—700 acres Al irrigable land on Tayah Creek, Reeves county, Texas; under independent canal; also in best shallow water belt in Texas; will sell in any size tracts. For further information write John J. Bush, Saragosa, Tex.

Classified Opportunities

[CONTINUED FROM PAGES 78 and 79.]

160 ACRES fine land, all under hog-proof fence; 50 acres in cultivation; fine timber; 3 miles from railroad; a bargain at \$10 per acre; good title. Address owner, J. A. Falkner, Easterly, Texas.

THE BLACK LANDS OF NORTH TEXAS are justly famous as the best in the world for the production of cotton, corn, wheat and oats—not one crop, but four. Once Goodwin's Denton Creek Subdivision consists of more than 3000 acres of this land, situated on the Denton and Wise county line, 50 miles northwest of Dallas, and is offered at reasonable prices—thirty to forty dollars per acre—and upon such terms that any man with a few hundred dollars cash can easily meet. The gradual and steady enhancement in value of such land should appeal to investors, while the very easy terms upon which it is offered should appeal to the farmer without a home. Address Fount Ray, Decatur, Texas.

SOUTH TEXAS LAND.—We deal in bargains in South Texas land, wholesale or retail; 10 acres or more garden, orange and berry land on easy monthly payments. Send for our illustrated literature. We also have large and small improved farms and ranches. 10,000 acres, Texas ranch, at \$1.35 per acre. 50,000 acres, 60 per cent. tillable, at \$3 per acre.

30,000 acres, with fine improvements, at \$3 per acre.
20,000 acres, all agricultural, at \$6 per acre.
29,000 acres, prairie, Chambers county, at \$16 per acre.

Write, stating what you want. L. Bryan & Co., Houston, Texas.

TEXAS FRUIT AND GENERAL FARM land close to Houston, Texas, which has a greater future than any city in the United States. Deep rich prairie soil will become very valuable in the near future. Farm tracts 50 acres or more, only \$25 per acre; good terms. Write for information. Investigate at once. C. H. Standish Land Co., Houston, Texas.

10,000 ACRES Nueces River bottom land; all subdivided into small tracts; very best truck and fruit land in Southwest Texas; will sell in small tracts or in a body. Emil Locke, 712 Gibbs Bldg., San Antonio, Texas.

COTTON AND CORN LAND.—12,500 acres, near two good railroads, being one mile from one and two miles from the other; splendid colonization tract; at \$10 per acre; one-fourth cash; balance 6 per cent. Address owner, Dr. C. S. Preston, 1007 Scanlan Bldg., Houston, Texas.

JAS. GOODE REAL ESTATE CO. ranch and irrigated lands. Office, Orient Hotel, Pecos, Tex.

THE FRIO VALLEY WINTER GARDENS. La Salle county, Southwest Texas, a colony of 100,000 acres level rich black sandy loam in famous arid belt; grow oranges, figs, Bermuda onions. We are opening Fowlerton, a new town on new railroad in heart of the colony. Guaranteed improvements on town-site. A 10-acre farm and free residence lot on terms of \$15 cash; balance \$10 monthly. Write for booklet A, prices, plans, etc. Fowler Brothers Land Co., Frost Building, San Antonio, Texas.

TEXAS FARM FOR SALE.—640 acres, near Crowell, Ford county, Tex.; 150 acres in cultivation; 500 acres good agricultural land; black, rich soil, now in grass; good fences and cross-fences; one three-room dwelling; good well and cistern; six miles from county seat and railroad; 1 1/2 miles from school and church; thickly settled; good neighborhood. Price \$25 per acre. Address William Woodard, Flat Creek, Tenn.

BISHOP, TEX.—Fastest growing town in Southwest Texas; cotton, fruit and vegetable land unexcelled. Write for booklet and sworn statements. Commercial Club, Bishop, Tex.

MACHINERY AND SUPPLIES

WANTED.—Every consumer in the Southwest to know that the Texas Rolling Mill Company of Fort Worth, Texas, manufactures track spikes, track bolts, machine bolts and nuts; also standard sizes of bar iron. One hundred tons always in stock. Prompt shipments our specialty. Satisfaction guaranteed.

LOCOMOTIVES FOR SALE

FOR SALE.—Ten locomotives, suitable for tramroad and sawmill purposes. Now being rebuilt at Tampa Northern Shops. Aripeka Sawmills, Tampa, Fla.

FINANCIAL

8 PER CENT. 5-YEAR OKLAHOMA FARM MORTGAGES.—Yes, rate is high, but sure and easily paid; conditions warrant it, and you get benefit; lands cheap, rich; values doubling; 25 years' experience in Southwest; 10 years bank cashier here; know people, lands, laws, resources, local conditions; never lost a mortgage nor had a title contested; abundant references; circular; investigate. J. G. James, Roff, Oklahoma.

PATENT ATTORNEYS

EUGENE C. BROWN, ENGINEER and Patent Lawyer, Suite 40 Victor Building, Washington, D. C. Member Bar U. S. Supreme Court. Patents and Trademarks. Inventions are considered both from Engineering and Legal standpoints in my prosecution of patents. An experience of over 9 years as Examiner in U. S. Patent Office and over 6 years as Patent Expert in important patent suits are my special qualifications. Reports upon validity and infringement. Send sketch of invention for advice.

PATENT YOUR IDEAS.—\$100,000 offered for one invention, \$3500 for another; look "How to Obtain a Patent" and "What to Invent," sent free; send rough sketch for free report as to patentability; patent obtained or fee returned. We advertise your patent for sale at our expense. Chandler & Chandler, patent attorneys, 978 F street, Washington, D. C.

PATENTS Secured or Fee Returned. Send sketch for free report as to patentability. Guide book and what to invent, with valuable list of inventions wanted, sent free; \$1,000,000 offered for one invention; \$10,000 for others. Patents secured by us advertised free in World's Progress; sample free. Victor J. Evans & Co., Washington, D. C.

PATENTS FOR SALE

WE HAVE recently secured the following patents. Address all communications to Sales Dept., Victor J. Evans & Co., Washington, D. C.: C. C. Siler, oilcloth rack; J. F. Slusser, stopper extractor; F. J. Welch, life preserver; Geo. M. Rain, trapping device; Jos. M. Papendry, armor plate; Jos. F. Kaminski, snowshoe; Henry Herr, plow; Asher Beal, irrigating ditch controller; E. W. Gould, metallic door; L. E. Findahl, valve; F. Denamore, rail joint; F. W. Crow, non-refillable bottle; Ellsworth Goble, clamp; Wm. Firman, drilling machine post; W. J. Elcher, penholder; Louis Dobbertin, flying machine; W. T. Francis, shaver and collar press; John A. Bents, music-leaf turner and book holder; W. A. Holcomb, wire stretching device; Jos. M. Frederick, bottle-filling machine; Harry C. Muir, cabinet; Leonard E. Steel, pin lock; A. F. Salstrom, collapsible cup or tray; Benj. F. Souther, music-leaf turner; John M. Leonard, switch; J. E. Sheaffer, fireless cooker; B. M. Sharit, ew holder; Russell Kneale, treatise.

PROPOSALS

PUBLIC BUILDINGS.

CONSTRUCTION BONDS

MISCELLANEOUS.

GOVERNMENT PROPOSALS

PROPOSALS FOR BRASS TUBING, CAST-IRON Pipe, Stovepipe, Sheet Zinc, Solder, Steel Wire, Nails, Tacks, Screws, Cold Chisels, Hammers, Pick Handles, Shovels, Ratchet Braces, Files, Paint Brushes, Coal Barrows, Padlocks, Water Coolers, Metallic Tapes, Manila Rope, Sash Cord, Rubber Belting, Hose, Packing, Asbestos Gaskets, Signal Flags, Bunting, Shipping Tags, and Chipped Soap. Sealed proposals will be received at the office of the General Purchasing Officer, Isthmian Canal Commission, Washington, D. C., until 10.30 A. M. February 28, 1912, at which time they will be opened in public, for furnishing the above-mentioned articles. Blanks and general information relating to this Circular (No. 384) may be obtained from this office or the offices of the Assistant Purchasing Agents, 24 State Street, New York City, and 614 Whitney-Central Building, New Orleans, La.; also from the U. S. Engineer Offices in the following cities: Baltimore, Md.; Philadelphia, Pa.; Pittsburgh, Pa.; Boston, Mass.; Buffalo, N. Y.; Cleveland, Ohio; Cincinnati, Ohio; Chicago, Ill.; St. Louis, Mo.; Detroit, Mich.; Milwaukee, Wis.; St. Paul, Minn.; Chattanooga, Tenn.; Louisville, Ky.; Mobile, Ala.; and Galveston, Tex.; Commercial Club, Kansas City, Mo., and Chamber of Commerce, Quincy, Ill. F. C. BOGGS, Major, Corps of Engineers, U. S. A., General Purchasing Officer.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., February 7, 1912. Sealed proposals will be received at this office until 3 o'clock P. M. on the 30th day of March, 1912, and then opened, for the construction, complete (including plumbing, gaspiping, heating apparatus, electric conduits and wiring, and interior lighting fixtures), of the United States Postoffice and Courthouse at Del Rio, Tex. The building is of three stories, basement, and unfinished attic. It has a ground area of approximately 6300 square feet; non-fireproof construction throughout; stone, terra-cotta, and stucco facing; wood cornice and copper gutters; tile and tin roof. Drawings and specifications may be obtained from the custodian of site at Del Rio, Tex., or at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., February 12, 1912. Sealed proposals will be received at this office until 3 o'clock P. M. on the 25th day of March, 1912, and then opened, for the construction, complete (including plumbing, gaspiping, heating apparatus, electric conduits and wiring, and interior lighting fixtures), of the United States Postoffice at Talladega, Ala. The building is one story and basement and has a ground area of approximately 4000 square feet; fireproof first floor; stone facing, and tin roof. Drawings and specifications may be obtained from the custodian of site at Talladega, Ala., or at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., February 13, 1912. Sealed proposals will be received at this office until 3 o'clock P. M. on the 29th day of March, 1912, and then opened, for the construction of the postoffice building at Massillon, Ohio. The building is one story and basement, approximately 82 by 70 feet in size, of fireproof construction throughout. The exterior walls are faced with stone and the roof is covered with asphalt felt and tile. Drawings and specifications may be obtained from the custodian of site at Massillon, Ohio, or at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., February 16, 1912. Sealed proposals will be received at this office until 3 o'clock P. M. on the 30th day of March, 1912, and then opened, for the construction, complete (including plumbing, gaspiping, heating apparatus, electric conduits and wiring, and lighting fixtures), of the United States Postoffice at Darlington, S. C. The building is one story and basement and has a ground area of approximately 4000 square feet, non-fireproof construction, stone facing, and tin roof. Drawings and specifications may be obtained from the custodian of site at Darlington, S. C., or at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., February 8, 1912. Sealed proposals will be received at this office until 3 o'clock P. M. on the 7th day of March, 1912, and then opened, for the construction of a wall on the premises of the U. S. Postoffice at Anniston, Alabama, in accordance with the drawings and specification, copies of which may be had at the office of the Custodian at Anniston, Alabama, or at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect.

U. S. ENGINEER OFFICE, 920 17th St., N. W., Washington, D. C., January 27, 1912. Sealed proposals for furnishing and placing riprap on the seawall, Anacostia River, D. C., will be received here until 12 M. February 28, 1912, and then publicly opened. Information on application. W. C. LANGFITT, Lieut.-Col., Engrs.

U. S. ENGINEER OFFICE, 920 17th St., N. W., Washington, D. C., January 27, 1912. Sealed proposals for furnishing and delivering building stone and Portland cement will be received here until 12 M. February 28, 1912, and then publicly opened. Information on application. W. C. LANGFITT, Lieut.-Col., Engrs.

U. S. ENGINEER OFFICE, MOBILE, ALA., February 7, 1912. Sealed proposals for alterations to the seagoing hydraulic dredge Wardard will be received here until 12 noon March 8, 1912, and then publicly opened. This dredge is now at Havana, Cuba, where it can be inspected. Information on application. C. A. F. FLAGLER, Major, Engrs.

MISCELLANEOUS

Open Ditches

NOTICE TO CONTRACTORS.

Notice is hereby given that the Drainage Commissioners of Sunflower County, Mississippi, will on Tuesday, the 5th day of March, 1912, let contracts for the digging of about twenty-two (22) miles of open ditches, involving the excavation of about eight hundred thousand (800,000) cubic yards of dirt, and the clearing of the necessary rights of way. Sealed bids will be received when accompanied by certified checks for \$3500. Bonds will be required of contractors, and the Commissioners will reserve the right to reject any and all bids.

For further particulars address D. M. Quinn of Indianola, Miss.

J. R. HERVEY, President.

Paving

Bastrop, La.

J. K. Skipwith, Mayor, Bastrop, La., will receive bids until noon March 12, 1912, for the construction of concrete walks as follows: 1358 linear feet of 8 feet walk, 600 linear feet of 7 feet walk, 3735 linear feet of 6 feet walk, 19,738 linear feet of 4 feet walk and 376 feet of 4 feet crossings. Specifications on file with Mayor. Bids to be accompanied with a cash deposit of \$500.

NEW BOND OFFERINGS

Bonds for Sale

Notice is hereby given that in pursuance of a resolution duly passed by the Mayor and Council of the City of Glennville, Ga., on the 5th day of February, 1912, the said Mayor and Council will on the 6th day of March, 1912, at 12 o'clock M. of said day, in the Council Chamber of said city, receive sealed proposals for, and sell to the highest and best bidder, all of said City of Glennville School Building Bonds for the sum of fifteen thousand dollars (\$15,000), in denominations of one thousand dollars each, bearing interest at the rate of 5 per cent. per annum, payable semi-annually. The said bonds will be dated February 1, 1912, and will mature as follows: \$5000 to mature at the end of ten years, \$5000 to mature at the end of twenty years, and \$5000 to mature at the end of thirty years from and after the date of said bonds. A certified check for \$1000 must accompany each bid as a guarantee of the good faith of the bidder. The right is reserved to reject any and all bids.

Proposals may be made in sealed envelopes addressed to R. B. Anderson, City Clerk of Glennville, Tattnall county, Georgia, and marked on the outside "Proposals for School Building Bonds."

By order of the Mayor and Council of the City of Glennville, Georgia.

Dated at Glennville, Ga., February 6, 1912.
R. B. ANDERSON,
City Clerk, Glennville, Ga.

Bond Sale

Alcorn County, Mississippi, will on April 2, 1912, at 2 P. M., at the Courthouse, in City of Corinth, sell to highest and best bidder for cash, \$11,500 Jail Bonds; 5 per cent; 10 years.

Address O. M. HINTON, Clerk.

Corinth, Miss.

Bonds For Sale

\$35,000 30-YEAR 5% INTEREST BONDS. INTEREST PAYABLE SEMI-ANNUALLY. The City of Union Springs, in Bullock county, Alabama, desires to sell its Sanitary Sewerage Gold Bonds, issued to the amount of \$30,000, and \$5000 Water-Tower Bonds, each in denominations of \$500, bearing 5 per cent. interest, dated January 1, 1912, and running for thirty years. Interest and principal payable at the Hanover National Bank in New York City. Interest payable semi-annually on January the 1st and July the 1st of each year. Sealed proposals for the purchase of said bonds should be addressed to P. L. Cowan, City Clerk, Union Springs, Alabama, and should be accompanied by certified check for \$500, payable to said City Clerk, as an evidence of the good faith of such proposed purchaser, and such proposals will be received until 8 o'clock P. M. on Thursday, the 7th day of March, 1912, when all bids will be opened and considered in the presence of the Council. No bids for less than par will be considered. Assessed valuation of property.....\$1,000,000
Outstanding bonds.....20,000
Floating debts.....None
Population, 1910 Census.....4,865

County Bond Sale

Sealed bids will be received by the undersigned up to 11 A. M. March 11, 1912, for the purchase of \$1,600,000 road and bridge bonds issued by Tarrant county, Texas. These bonds are in the denomination of \$1000 each and bear interest at the rate of 5 per cent. per annum, payable annually, in either New York or Fort Worth, Texas.

Each bid must be for the entire issue, \$1,600,000.

Proposals will be considered one for delivery of the entire issue (\$1,600,000) April 10, 1912, and one for three deliveries, as follows: \$550,000 April 10, 1912; \$500,000 July 10, 1912, and \$550,000 October 10, 1912.

Certified check in favor of the Commissioners' Court of Tarrant County, Texas, in the sum of \$12,000 (2 per cent. of the amount to be purchased) must accompany each bid.

Bids will be opened and considered by the Commissioners' Court at 2 P. M. March 11, 1912.

The Commissioners' Court reserves the right to reject any or all bids.

Descriptive circular giving all data, information, etc., touching and relative to Tarrant county, its condition, resources, assets, liabilities, etc., together with all procedure in connection with this bond issue, may be had on application.

C. J. McKENNA, County Auditor,
Fort Worth, Texas.

PROPOSALS

PUBLIC BUILDINGS.

CONSTRUCTION BONDS

MISCELLANEOUS.

NEW BOND OFFERINGS

\$100,000 City of Dallas, Texas, 4½ Per Cent., Gold City Hospital Building Bonds

TO BE SOLD MONDAY, FEBRUARY 26, 1912.

The bonds are issued by the City of Dallas, Dallas county, Texas, under authority of the City Charter and General Laws of Texas, and by special authority of a vote of the people at a general election held April 5, 1910.

Bonds are dated January 1, 1912, and are in denominations of \$1000 each, with coupons attached, and mature serially beginning January 1, 1913—\$2000 and \$3000 each alternate year until 1922—average time 20½ years, both principal and semi-annual interest payable in gold coin at the Chase National Bank in the City of New York.

The bonds are engraved under the supervision of and certified as to their genuineness by the United States Mortgage and Trust Company of New York, and their legality has been approved by the Attorney-General of the State of Texas, and by Messrs. Dillon, Thomson & Clay of New York, whose original written opinion as to legality will be furnished to the purchaser of the bonds.

Direct tax levies have been made sufficient in amount to provide interest and the required sinking fund to retire the bonds as they mature.

The City of Dallas has been incorporated by Special Charter for a period of more than thirty years, and at no time in its history has there been any default in the payment of any interest or principal on its bonded debt or other obligations.

Sealed bids will be received for the above described bonds until 12 o'clock noon Monday, February 26. A certified check, payable to the undersigned, for 2 per cent. of the face value of the bonds bid for must accompany each bid. Money to be paid and bonds to be delivered at Dallas.

The City of Dallas reserves the right to reject any or all bids.

W. T. HENDERSON,
Commissioner of Finance and Revenue, Dallas, Texas.

\$40,000 Bonds

Sealed proposals will be received by C. G. Seaton, Secretary Board of Education, Gary, McDowell county, W. Va., until 2 o'clock P. M. March 1, 1912, for \$40,000 6 per cent. coupon 20-34 Adkin District School Bonds. Bonds shall be forty in number, of the denomination of \$1000, each dated on first day of March, 1912, and payable at Gary National Bank, Gary, W. Va. They shall have coupons attached for the payment of the interest thereon, and the same shall be paid semi-annually at the same place that the bonds are payable, on the first day of September, 1912, and first day of March, 1913, and so on for each succeeding year until the bonds mature, unless sooner redeemed or canceled pursuant to law.

Bids will be considered for all or any portion of said bonds; no bid considered for less than par. Right to reject any and all bids reserved. Bids must be accompanied by certified check for \$100, payable to Board of Education, Adkin District.

\$150,000 Bonds

Sealed proposals will be received by G. Lee McGlasson, Clerk, Gainesboro, Tennessee, until 2 o'clock P. M. March 16, 1912, for \$150,000 Coupon 20-30 Jackson County, Tennessee, Good Roads Bonds. Same not to exceed 4½ per cent. interest. Bonds to be dated, delivered and paid for as follows:

\$50,000 April 1, 1912.
\$50,000 October 1, 1912.
\$50,000 April 1, 1913.

Interest payable annually April 1 of each year. Denomination, \$1000. Bids will be considered for all or any portions of said bonds. Bids must be accompanied by certified check for 10 per cent. of bid, payable to order of Trustee, Jackson County, Tenn., as a guarantee of good faith. No bid considered for less than par. Right to reject any and all bids reserved.

T. M. GAILBREATH, Chrm. Co. Crt.
G. LEE MCGLOSSON, Clk. Co. Crt.
J. M. DEAN, Sect. G. R. Commrs.
Gainesboro, Tenn., January 10, 1912.

North Carolina Drainage District Bonds, Issued Under the Laws of the State, For Sale.

Sealed bids will be received at the office of the undersigned at Dover, North Carolina, until February 15, 1912, at 12 o'clock M. for the purchase of forty-five thousand dollars (\$45,000) Moseley Creek Drainage District Bonds to be issued in accordance with the laws of the State of North Carolina. Public Acts of 1909, as amended by Public Laws of 1911, bearing interest at 6 per cent. per annum, payable semi-annually; said bonds payable in ten (10) equal installments; the first installment of principal to be due and shall mature at the expiration of three (3) years from date of issue, and one (1) installment for each succeeding year for nine (9) additional years; to be issued in denominations to suit purchaser, and payable at such time and place as may be designated by purchaser upon acceptance of bid.

These bonds are exempt from all county or municipal taxation or assessment, general or special, and the interest thereon shall not be subject to taxation as for income, nor shall said bonds be subject to taxation, nor the coupons thereon, when constituting a part of the surplus of any bank, trust company or other corporation, and are deductible from the assets of such corporation in ascertaining the taxable value of the shares of such corporations.

Bids invited for the whole or any part of said bonds. Certified check of proposer in the sum of \$500 required to accompany bids for the whole of such issue, or proportional part less than for whole.

Right to accept any and all bids reserved. Bidders may submit form of bond with bid, or the same will be issued in form requested by successful bidder at the time of acceptance of bid.

All further information concerning legality of issue may be had by application to Guion & Guion, Attorneys, New Bern, North Carolina.

All bids must be submitted to the undersigned at his office at Dover, North Carolina. This December 20, 1911.

PRESIDENT MOSELEY CREEK
DRAINAGE DISTRICT.

NEW BOND OFFERINGS

Bond Sale

On the first Monday of April, 1912, the Highway Commissioners of Murphy Township, Murphy, N. C., will receive bids on 30-year coupon bonds to the amount of from \$50,000 to \$100,000.

Bidders are requested to submit bids on these bonds, to bear interest at the rate of 5 per cent. and 6 per cent. per annum.

All proposals must be accompanied with check for \$500 as evidence of good faith.

Address all communications to Mr. L. Mauney, Secretary.

HIGHWAY COMMISSION,
Murphy, N. C.

\$15,000.00 Morehead City, (North Carolina) Municipal Bonds, Interest 5½ Per Cent.

The town of Morehead City, North Carolina, requests bids for (\$15,000) fifteen thousand dollars par value five and one-half per cent. thirty-year coupon bonds, interest payable semi-annually, to be issued for the purpose of paying the floating indebtedness caused by extending the water-works and electric-light system and street improvements.

Sealed proposals will be received for the same up to eight o'clock P. M. the 4th day of March, 1912, and the same will be opened and publicly read at the meeting of the Board of Commissioners that day. Each bid must be accompanied by a certified check for the amount of five hundred dollars (\$500) as guarantee of entering into the contract according to the terms of the contract if accepted.

The city reserves the right to reject any or all bids and to accept that which may seem to be to the interest of the city of Morehead City. Principal and interest payable at the city of New York.

R. N. AYCOCK, Secretary.

MISCELLANEOUS

Supreme Court Building

Tallahassee, Fla.
The State Building Commission of Florida invites sealed proposals for the construction of a Supreme Court Building to be erected at Tallahassee. Building 75x125 feet, three stories in height, reinforced concrete construction, exterior of brick and terra-cotta, steam heated. Drawings and specifications may be seen at office of the Governor, Tallahassee, Fla., and at office of P. Thornton Marye, Architect, Candler Bldg., Atlanta, Ga. Copies of drawings and specifications may be procured upon application to said Architect, accompanied by a deposit of \$15 to insure return of drawings. Sealed proposals, accompanied by a certified check for \$1000, payable to the State Treasurer of Florida, will be received by the Governor, Tallahassee, Fla., up to three o'clock P. M. Friday, March 29, 1912. Right reserved to reject any or all proposals submitted.

Grading

NOTICE TO CONTRACTORS.

Murphy, N. C., February 6, 1912.
Sealed proposals will be received by the Murphy Township Highway Commission, at their office in Murphy, until 2 P. M. Monday, March 4, 1912, for grading the Hanging Dog road and a short section of Peachtree street, a distance of approximately eight miles.

The work will consist of approximately—
68,000 cubic yards Grading.

1,300 linear feet Vitrified Pipe.

550 cubic yards Rubble Masonry.

6,300 pounds Structural Steel.

Plans, profiles and specifications are on file at the office of G. W. Scott, Engineer, Court-house building, and blank forms for proposals will be furnished upon application to the Engineer. Deposit, five hundred dollars (\$500) cash, or certified check, payable to Treasurer of Murphy Township Highway Commission. The right to reject any or all bids is reserved. Correspondence should be addressed to Engineer. Approximately fifteen miles additional will be let in the near future.

W. H. WOODBURY, Pres.
M. L. MAUNEY, Secy.

Masonry Dam, City of Baltimore, Md.

Sealed proposals for the construction for the City of Baltimore of a solid masonry dam with a spillway elevation of approximately 186 feet A. M. T., with appurtenances, to be built according to the plans and specifications to be obtained at the office of the Water Engineer, will be received at the office of the City Register, City Hall, Baltimore, Md., until eleven A. M. Wednesday, March 6, 1912.

Proposals must be enclosed in sealed envelopes, must be endorsed "Proposals for the construction of the New Loch Raven Dam," and addressed to the Board of Awards of Baltimore City.

Plans and specifications, proposal forms, etc., may be obtained on and after February 12, 1912, at the office of the Water Engineer, City Hall, Baltimore, Md., on the payment of ten dollars (\$10), which will be refunded on the return of same in good condition.

As an evidence of good faith each proposal must be accompanied by a certified check for twenty thousand dollars (\$20,000), drawn on a Clearing-house bank to the order of the Mayor and City Council of Baltimore; these checks will be returned to the unsuccessful bidders on the awarding of the contract, and to the successful bidder when the contract shall have been signed.

The successful bidder will be required to give bond equal in amount to the contract price for the faithful performance of the contract.

The Board of Awards reserves the right to reject any or all bids.

The estimated quantities of the principal items for the dam are as follows:

Cofferdam.
Earth and rock excavation foundation, 35,000 cu. yds.
Rock excavation cut-off trench, 4000 cu. yds.
Concrete and rubble concrete, 38,000 cu. yds.
Steel reinforcing bars, 21,000 lbs.
Steel bridge, 70,000 lbs.
Approved February 7, 1912.

EZRA B. WHITMAN,

Water Engineer.

JAMES H. PRESTON,

President Board of Awards.

New Jail

NOTICE TO CONTRACTORS.

Manchester, Clay County, Kentucky.

The Board of Jail Commissioners for Clay County invites sealed proposals for the erection and completion of a new Jail on the county's property, agreeable to plans and specifications adopted by said committee.

Said plans will be on file on and after 20th day of February, 1912, in the County Judge's office, in the Courthouse in Manchester, Ky. A copy of said plans and specifications will be furnished to anyone wanting to bid on said Jail by leaving a certified check with T. J. Rawlings, chairman of the jail committee, said check to be returned when the plans and specifications are returned in good order.

Bids will be received until 12 P. M. April 1, 1912; same should be plainly marked "Proposal for New Jail," and addressed to T. J. Rawlings, Chairman of Jail Committee.

Each bid must be accompanied by a certified check for \$1000 on some well-known bank, made payable to T. J. Rawlings, as evidence of good faith, and if their bid is accepted, as a guarantee that they will enter into contract at once and give an acceptable bond in sum of \$20,000 for the faithful performance of the contract. Should they fail to enter into contract, the check will be forfeited to Clay county as liquidated damages by reason of the delay.

The Fiscal Court will meet on the second day of April, 1912, and will accept whatever bid they think best for the county, but reserves the right to reject any and all bids.

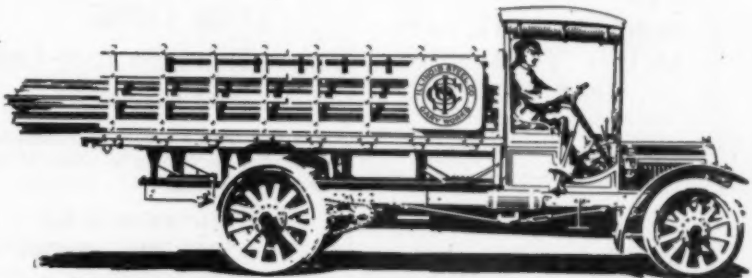
T. J. RAWLINGS,
Chairman of Jail Committee for
Clay County, Kentucky.

Bridge

Sealed bids will be received by the undersigned until Monday, March 11, 1912, 12 o'clock, for furnishing the material and constructing an iron or steel bridge across Doe River at Roan Mountain, Carter county, Tenn., including the piers. Plans and specifications furnished by the undersigned on application.

This February 12, 1912.

S. B. WOOD,
Chairman Bridge Committee,
Elizabethton, Tenn.



Illinois Steel Company uses our trucks in their works at Gary, Indiana, for transporting raw and manufactured steel between their various mills, thus replacing industrial railways.

Proved by
12 years of
real service

Mack and Saurer

Proved by
17 years of
real service

"Leading gasoline trucks of the world"

Almost any kind of a motor-truck will give satisfactory service for a year or two, but the Mack and Saurer are the only trucks with 12 to 17 years of actual service and the proof that this implies.

Capacities of 1, 1½, 2, 3, 4, 4½, 5, 6½, 7½, and 10 tons, built in our own plant with bodies to suit each individual business.

We have valuable information about motor-trucks in connection with most every business. Let us send you data about yours.

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Sales and Service Stations in New York, Chicago, Philadelphia, Boston, San Francisco and other large cities

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FOR LEASE OR SALE ON EASY TERMS

Two-story brick factory building 200x60 feet, with ells, giving total floor space 30,000 sq. ft., with power, light, heat and water, automatic sprinkling system, 150 H. P. Corliss engine and two boilers. Site 385x200 feet, within corporate limits; abundant help nearby; accessible to electric cars, railroad and steamboat lines.

BARTON MYERS,

NORFOLK, VA.

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SOUTHERN KNITTING MILL FOR SALE

The most modern and best equipped knitting mill in the South for a production of 300 dozen ladies' ribbed vests and pants daily.

Experienced operators, fine selling connections, and well established with the trade.

Have contracted for 60 per cent. of year's yarn requirements at a price below the market, and good per cent. of year's production sold at a good profit.

Will sell for cash at a reasonable price, and can be turned over without a moment's lost time or any curtailment of production.

If interested in having a plant of this kind in the South, consider this a great opportunity.

Construction and equipment the best, having an insurance rate of 1/2 of 1 per cent.

Can give full information, showing other advantages, if interested.

Address "KNITTING," care Manufacturers Record.

J. T. KIMBROUGH WE LOCATE MANUFACTURERS REAL ESTATE

409-10 Atlanta National Bank Bldg.

ATLANTA, GA.

SAW MILLS With TIMBER FOR SALE

An up-to-date, going plant; two mills; daily capacity, 200,000 feet; planing mills, box factory, lath machinery, still machine, log railroads; everything modern, fully equipped and in successful operation. Western white pine timber owned and controlled sufficient to run 40 years. Has always been profitable, and future seems equally promising. Location in Southwest; especially healthful and advantageous. A bargain; sale necessary to close estate. Terms reasonable. Purchaser should have \$400,000 cash and securities or more. Buy of owners at bed-rock prices.

E. S. GOSNEY, Administrator
PASADENA, CALIF.

WANTED

A competent Roofing Salesman widely acquainted in Southern, Southwestern, Northwestern and New York territories and thoroughly familiar with the sale of Asphalt Roofings and Coal Tar Products. Inexperienced applicants are not desired. Address "ASTAR,"

Care Manufacturers Record.

Complete Saw Mill Plant, Dry Kiln and Logging Equipment FOR SALE

Mill has a daily capacity of 25,000 feet. Logging outfit consists of Locomotive, three and one-half miles of tramroad and six log trucks. Eighteen to twenty million feet of choice Pine timber, well blocked. Mill located about 35 miles south of Savannah, on the Seaboard Air Line Railway. Fifteen to twenty million feet additional timber can be had in easy reach of this plant. For full particulars address

ALBERT FENDIG & CO., Brunswick, Ga.

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Business Opportunities, Timber Lands,
Realty Investments

We will take pleasure in submitting information pertaining to either of the above departments.

S. L. NUSBAUM & CO.

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FOR SALE

Now operating to full capacity. Inexhaustible clay deposit. Good-paying investment, but present owner has good reasons for wishing to sell. Address

"BRICK PLANT,"

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CHESAPEAKE BAY

Water-front farms and estates for sale, from ten to fifty dollars per acre. Productive lands, beautiful home sites. Fish, crabs and oysters in abundance and free for the taking. Wild ducks, geese, rabbits and quail shooting. Address

COLONIAL LAND COMPANY,

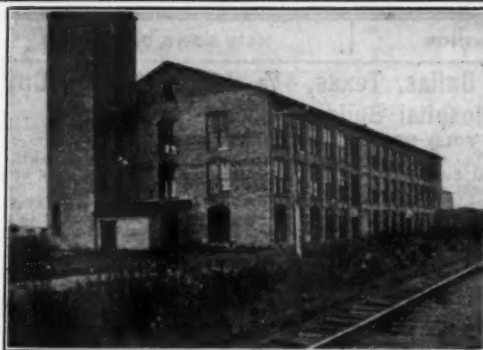
306 Law Building

Baltimore, Md.

A corporation with offices in New York and Philadelphia, at present representing one of the largest manufacturers of Railroad Equipment in the country, and having an engineering staff and an experienced sales organization, doing an extensive business with railroads and industrial plants in the East, desires to obtain the Eastern agency for a large manufacturer of railroad or industrial equipment.

Address E. N. M.,

Care Manufacturers Record.



MODERN FACTORY Building For Sale

New; size 60x200; standard construction; hard track; cheap coal; natural gas assured; cheap labor; no unions; exemption from taxation; five acres ground; in best 10,000 population city in South. Full information upon request.

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Columbus, Miss.
Alfalfa lands a specialty.

COTTON YARN MILL FOR SALE

Located in Texas. Two-story stone buildings 85x150 feet; 7070 spindles, complete equipment of modern machinery. 20 acres land, 20 houses for operatives.

Address YARNS,

Care of Manufacturers Record.

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Immediate Delivery, Rebuilt and Guaranteed

ENGINES

25"x48" Wetherill Corliss, 150 lbs. steam, extra heavy.
18"x36" Hamilton Corliss.
One (1) each 14"x18", 16 1/2"x18", 14"x28" and 12"x24" Buckeye.
One (1) 15"x16" New York Safety Center Crank.
Large assortment of Slide-Valve Engines, all sizes.

BOILERS

One (1) 250 H. P. Sterling, New.
Two (2) 200 H. P. Helme W. T.
One (1) 72"x18" H. R. T., 100 lbs. steam.
One (1) 48"x20" H. R. T., 125 lbs. steam.
Large assortment of Vertical and Locomotive Boilers.

AIR COMPRESSORS

18"x18 1/2"x24" Ingersoll-Sergeant.
14"x9"x12" Ingersoll Two-Stage, "Imperial" type.
14 1/2"x9 1/2"x8" Ingersoll Two-Stage, belt driven.
12"x14"x12" Hall, steam driven.
14"x12" Laidlow-Dunn, belt driven.
12"x12"x12" Laidlow-Dunn, steam driven.
10"x7"x8" Ingersoll, belt driven.
And many others.

HEATERS

1000 H. P. Berryman Gleaner.
500 H. P. Berryman.
500 H. P. Berryman.
400 H. P. Wetherill.

PUMPS

One (1) 18"x26"x18" Snow Duplex.
Two (2) 16"x10 1/2"x10" Worthington Duplex Pumps.
One (1) 10"x12" Duplex D. A. Smith-Valle Power Pump.
6"x6" Davis Plunger.
500 H. P. Conover Jet Condenser, complete.
Vacuum and Condensing Pumps, all sizes.

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Large stock of Machine Tools. Note my adv. in last week's issue. Send for Special List. Correspondence solicited.

HERMAN L. WINTERER

908-910 Beach St.

Philadelphia, Pa.

WANTED

Belt-driven single-stage straight-line Air Compressor to supply 175 to 200 cubic feet free air per minute at 60 to 100 lbs. pressure. Also one steam-driven Compressor as above. Also one 750-gallon-per-minute UNDERWRITERS' FIRE PUMP.

Reply to BOX 559, Dothan, Ala.

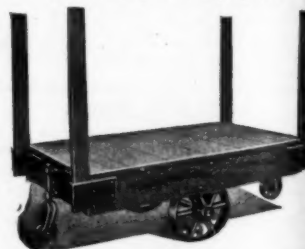
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One single cylinder gasoline roller, nearly new; price low.

J. M. B. & SONS, care Manufacturers Record, Baltimore, Md.

Roller Bearing CARS AND TRUCKS

of all kinds, for all purposes



Style 50

Switches, Turntables

Complete Industrial Railway Equipment

Write for Catalogue and Prices

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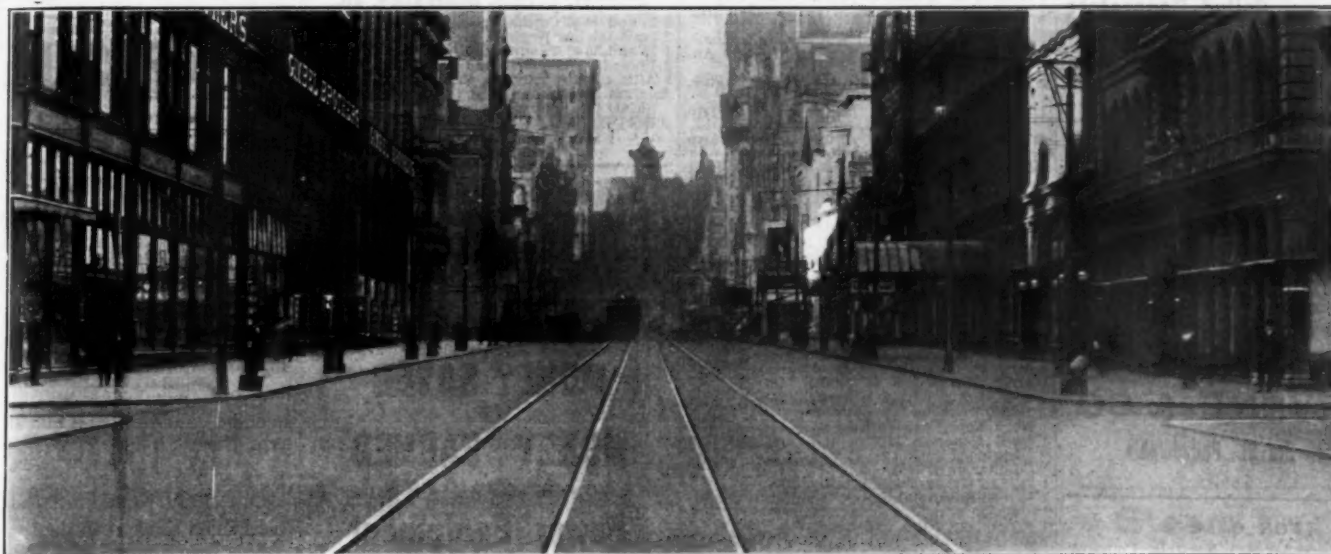
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Comfort for Men---or for Horses?

The only objection ever offered to the silent U. S. Wood Block pavement is that it is inferior to granite block pavement as a footing for horses. It is no more slippery than asphalt or any other smooth pavement and, in fact, is not slippery at all except under certain weather conditions which occur only a few days in the year.

When Wood Block pavement is proposed in a new location, there frequently arises this question, whether the discomfort of the horses on these few days each year shall be considered above the comfort of men on *every* day of the year, and especially in the open window season.

On a granite block pavement, a single truck grinds its way down the street with a noise like a gattling-gun. That pavement will only benefit that horse on a few days in the year, and for the rest of the time both the horse and its driver would prefer the smooth, easy traction of Wood Block pavement. During at least 350 days of the year the truck driver can take a heavier load over the Wood Block pavement than over granite blocks. Whether his load be heavy or light, the truck driver will on 350 days of the year go out of his way if

necessary, in order to get the smooth, easy traction of Wood Block pavements.

Wood Block pavements always attract traffic wherever they are in use. The reduction in the noise accomplished by the use of U. S. Wood Blocks greatly improves the value of stores and offices, facilitates the transaction of business, frequently brings about higher renting values and higher assessment values. It attracts pedestrian traffic as well as making the street a more important thoroughfare for vehicles.

Property owners are always ready to petition for Wood Block pavements, and frequently ask for the privilege of paying the difference in cost in order to obtain them.

Let the horses avoid the smooth pavements on those few slippery days of the year, and let the men and women have comfort and quiet the whole year round.

No one likes to see a horse struggling on a slippery pavement, but the occasional discomfort of the horse is of insignificant importance compared with the year-round comfort of both horses and people.

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One 20"x24"x12 1/2"x20" Norwalk Compressor. One 15"x12" Bull Engine. One 15"x14" Bull Engine. One 20"x48" Corliss Engine. One 13"x18" Center-Crank Slide-Valve Engine. One 12 1/2"x15" Hoisting Engine, double drums 54" diameter. One 7"x10" D. C. D. D. Hoisting Engine and Boiler. Three 5"x8" Double-Drum Hoisting Engines and Boilers. One 6 1/4"x10" Double-Drum Hoisting Engine and Boiler. One Deane 12 and 20"x10 1/2"x12" Duplex Piston Pattern Pump.

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- 2 14x42 R. H. Fraser and Chalmers Corliss Engines.
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- 1 22x42 Heavy Duty Side Crank Hamilton Corliss Engine.
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- 1 9x12 Horizontal Ideal Automatic Engine, mounted on cast-iron base.
- 2 78"x20" Horizontal Triple Riveted Lap Joint Boilers, 110 pounds pressure.
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- 1 66"x16" Horizontal Triple Riveted Butt Strap Boilers, 120 pounds pressure.
- 3 60"x16" Horizontal Double Riveted Butt Strap Boilers, 100 pounds pressure.
- 1 42"x14" Horizontal Triple Riveted Butt Strap Boilers, 120 pounds pressure.
- 1 90"x16" Internally Fired Marine Boiler, 95 pounds pressure.
- 1 12x10 Worthington Duplex Pump.
- 1 7 1/2"x4 1/2"x10 Worthington Duplex Pump.
- 1 6x4x6 Deane Duplex Pump.
- 1 14-ton Kelly-Springfield Road Roller.
- 1 50 H. P. Fairbanks-Morse Gasoline Engine.
- 1 25 H. P. Superior Gas Engine.
- 1 20 H. P. Lima Gas or Gasoline Engines.
- 1 20x12" Austin Jaw Crusher.
- 1 18"x12" Austin Jaw Crusher.
- 1 14"x10" Austin Jaw Crusher.
- 1 No. 1 Root Positive Blower.
- 1 Snell Concrete Mixer, half-yard capacity, equipped with 5 H. P. Engine and 6 H. P. Boiler on trucks.
- 1 2 1/2" to 12" Jarecki Pipe Machine.
- 1 10-ton Industrial Locomotive Crane, four-wheel, standard gauge, 28' boom.
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- 1000 to 8000-gallon capacity Storage Tanks.

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CHICAGO, ILLINOIS

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We have the largest stock of second-hand electric motors and generators in America, and buy and sell, rent, exchange and repair electrical machinery of all kinds. Send for our "Monthly Bargain Sheet," showing complete stock with net prices. All machines guaranteed in good order.

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- 1 22 and 40-36 Corliss Cross Compound.
 - 2 24x48 Corliss Engines.
 - 1 22 and 36-60 Tandem Corliss.
 - 2 Phoenix Tandem 12 and 20x16 Engines.
 - 1 Atlas Corliss Tandem, 22 and 24x48 Engine.
- Engines direct connected to generators.
SEND for list and prices.

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The best and the cheapest.
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- 1 30"x60" "Fishkill," girder frame, R. H. \$2500
- 1 24"x56" "Watts-Campbell," girder frame, L. H. 1900
- 1 20"x48" "Harris," girder frame, L. H. 1450
- 1 18"x36" "Naylor," girder frame, R. H. 1350
- 1 16"x32" "Ohio," heavy duty, L. H. 1250
- 1 14"x36" "Frick," girder frame, R. H. 750
- 1 12"x24" "Whitehill," girder frame, R. H. 650
- 1 9"x24" "Cooper," girder frame, L. H. 500

AUTOMATIC ENGINES

- 1 27"x18" "Armington & Sims," C. C. 1250
- 1 16 1/2"x16" "Weston," C. C. 850
- 1 13"x12" "Erie Ball," C. C. 850
- 1 12"x14" "Atlas," C. C. 300
- 1 10"x12" "Atlas," C. C. 225
- 1 10"x10" "Westinghouse," C. C. 250

HORIZONTAL SLIDE VALVE ENGINES

- 1 16"x18" "Erie City," S. C. 500
- 1 15"x16" "Nagle," C. C. 400
- 1 10"x12" "Nagle," C. C. 150
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- 26x16 Reed, compound rest, P. C. F.
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- 24" Hamilton, sliding head.
- 3-spindle Barnes, gang.
- 7-spindle Slate, bedstead.

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- 20" and 24" Hendey, friction.
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- Planer, 30x30x10 Gleason, 1 head.
- Planer, 36x36x12 Betts, 4 heads.
- Planer, 48x48x8 Farrell, 1 head.
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Vulcan Iron Works, Locomotives
W. J. Oliver Mfg. Co., Dump Cars
George M. Newhall Engr. Co.,
Industrial Locomotive Cranes
National Hoisting Engine Co.,
Hoisting and Swinging Engines
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New Light Rail Re-laying Rail

AND A LIMITED AMOUNT OF STRICTLY
FIRST CLASS SECOND-HAND
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We have in stock and can make prompt shipment of all weights of No. 1 relaying rails and angle bars. Subject to inspection.

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Successors to BLOCK-POLLAK IRON CO., Chicago.

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(DUMPED BY AIR OR HAND)

Only AIR DUMP CAR under absolute control of operator. Can be brought back to upright position, after passing center of gravity, before entire contents of car have been unloaded. This admits of equal distribution of material on both sides of track. Write THE WM. J. OLIVER MFG. CO., KNOXVILLE, TENN., AND 50 CHURCH ST., NEW YORK, N. Y.

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MANUFACTURERS OF THE
BURROUGHS RAILWAY NUT LOCKS
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MADE BY
RALEIGH IRON WORKS CO.
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Reduce Cost of Carrying Logs to the Mill

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Marion 1-yd. Dredge, used on one job, good order, cheap. Browning 1½-yd. Drag Line Machine, used little, low price. Several Marion Dredges, 1½ to 2-yd. capacity. If in want of machinery for drainage work or reclamation, write us. Address
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Complete stone setter's outfit, consisting of American Holst & Derrick Co. Hoisting Engine, Powers, Derricks, Wire Cable, Blocks, etc. All in first-class condition. Address
"OUTFIT," care Manufacturers Record.

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FROGS, SWITCHES, SWITCH STANDS, RAIL BRACES.



Light Revolving Shovels

For many requirements such as road and street construction, cellar and basement excavation, and brickyards, the small revolving steam shovel is practically indispensable. For this class of work, a pronounced favorite is

The Marion Model 28

Operated entirely by one man. Swinging in complete circles in both directions, it will dig and deliver material at any point within its radius. It will work safely and successfully on a 15 to 20% grade, and handle at a splendid profit excavations having cuts as shallow as 10 in. in depth. Its dipper capacity is ½ cubic yards.

Write Dept. H for Circular 28, giving more information.

Scraper-Bucket Excavators — Dredges**The Marion Steam Shovel Co., Marion, O.**

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Standard and Light "T" Rails, Girder Rails, Splice Bars, Frog Switches and Crossings for Steam Roads, Special Work for Street Railways, Structural Shapes, Tank, Boiler and Fire Box Steel Plates and Light Sheets, Pig Iron, Forgings, Steel Castings, Railroad Track Supplies.

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Two three-drum tandem Lidgerwood Hoisting Engines, size 14x18, D. C., reverse link motion and friction drums, equally as good as new.

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An Electric Jib Crane; two motors; cost \$1500; little used; guaranteed as good as new; 20.0 radius; 18.0 high; can be seen in position. Make us a bid for it. No reasonable offer refused, as we have no use for it. Also, Plain Slide-Valve Engine, thoroughly overhauled; size 9x16; no use for it. J. T. SEVERNS SONS & CO., Burlington, N. J.

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Steam Shovels, Dredges, Drag Line Excavators, Wrecking Cranes, Unloading Plows, Loco Pile Drivers.

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15-Ton Browning Locomotive Crane

Purchased new in 1909 at a cost of \$6800. Has canopy top, 38' boom, and is equipped with ¾-yd clamshell bucket, bucket trolley and track and a 1-yard shovel attachment. Our cash price, \$3600.

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FOR SALE—One industrial 8-wheel standard-gauge Locomotive Crane, 10-ton capacity, equally as good as new. Crane equipped for clamshell bucket, self-propelling, 50' steel boom

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2 Little Giant Traction Shovels.
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Flat, Box, Stock, Caboose and Logging Cars; Combination and Passenger Coaches; Rails, Castings, Gearing, etc.; Bogie Wheels for any Gauge of Track; Machinery Repaired, Locomotive, Marine, Stationary, Sawmill, etc.

15 Locomotives, 36 and standard gauges.
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5 Stationary Engines, different sizes, several Boilers.
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Other Machinery, Logging Cars and Rail. Prompt Dispatch and Moderate Charges.

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Fewer parts to look after than in any other tie. Practically nothing to work loose or get out of order.

No tie plates necessary; nothing to corrode except four screw spikes that are almost instantly removed and replaced without disturbing the tie, and that, too, after many years of use.

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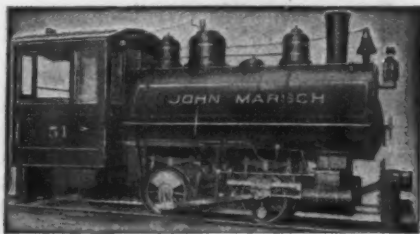
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LOCOMOTIVES

both Single Expansion and Compound and for All Gauges of track.

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For either permanent or portable track, especially designed to suit this service. Locomotives for Logging and Industrial purposes and for Mines and Furnaces.

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Especially adapted for heavy hauling on steep grades, sharp curves and uneven tracks. For logging, switching and pulling on main lines, mills, furnaces and industrial purposes.

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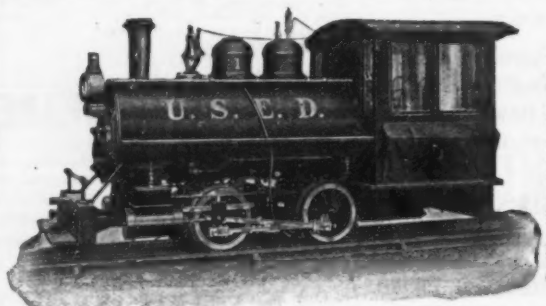
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If interested, write us for catalog "O."

36" and 56 1/2" gauge in stock for immediate delivery.

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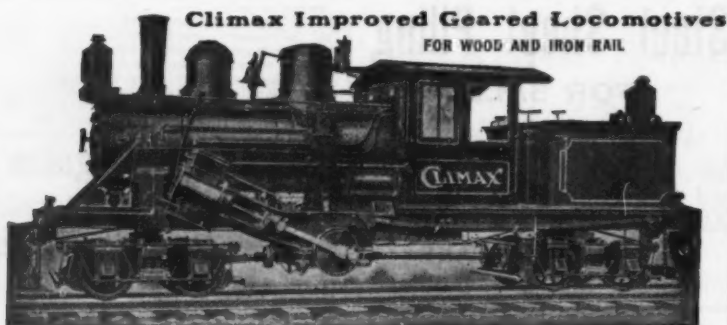
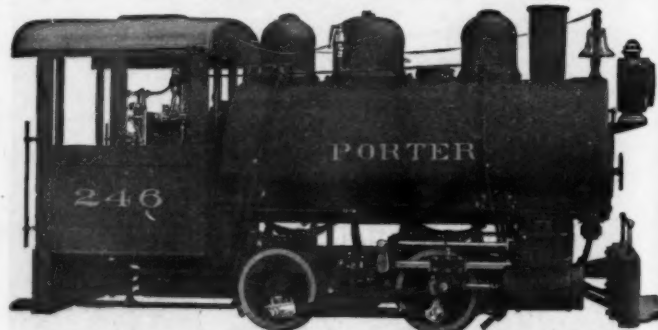
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United States Steel Sheet Piling

12" 40 lbs.
12" 35 lbs.

9" 16 lbs.
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Friestedt Interlocking Channel Bar Piling

12" 33 lbs.
12" 38 lbs.

15" 38 lbs.
15" 44 lbs.

Symmetrical Interlock Channel Bar Piling

10" 28 lbs.
10" 34 lbs.

12" 34 lbs.
12" 39 lbs.

15" 39 lbs.
15" 45 lbs.

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We make wheels of all kinds and for any purpose. Any size or capacity, to fit any axle.

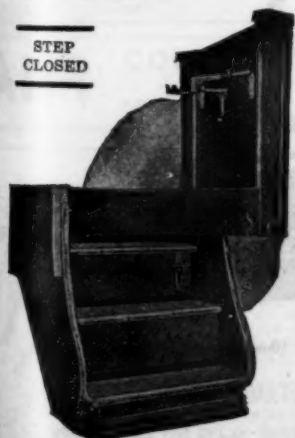
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P. O. BOX 700



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A Great Convenience and Achievement
Being Installed by Prominent Railroads

Blake Extension Car Step

Can be attached to any ordinary car step. Lowered when train stops and closed on starting, by simple mechanism on the platform. You can't let it down when train is in motion. Step goes up by closing trap door, by pressing foot on end of rod or by pressing rod with the hand while standing on ground. Step also closes if train moves three feet backward or forward, should the conductor neglect to close it. If anyone is standing on steps when train starts, step automatically unlocks and moves an inch or two, warning the person to get off. The step then closes when the person gets off, either to leave or get on the train.

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both Single Expansion and Compound and for All Gauges of track.

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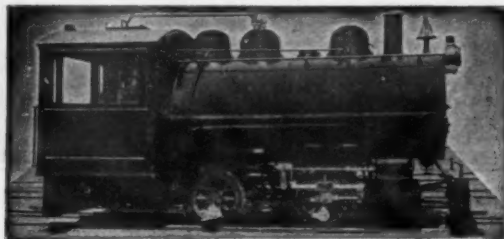
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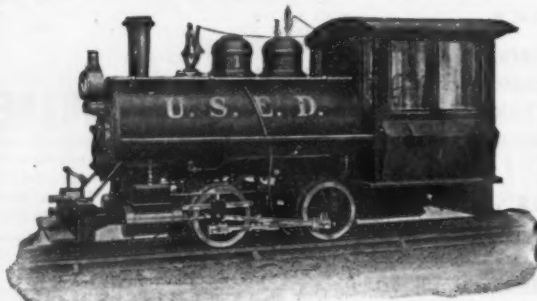
Heisler Locomotive Works

ERIE, PENNSYLVANIA, U. S. A.

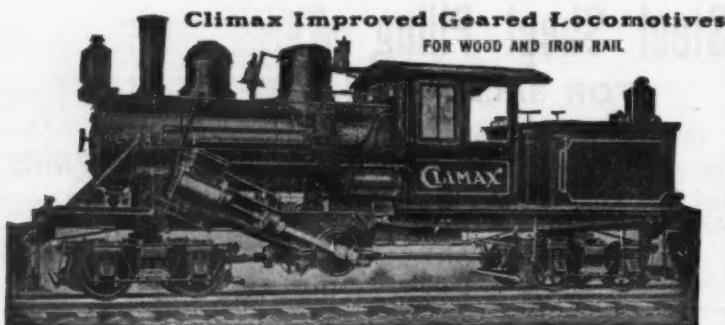
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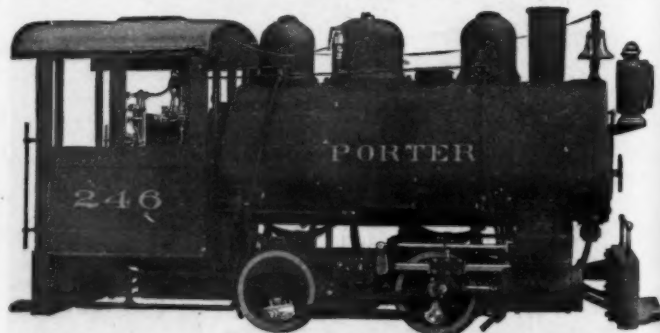
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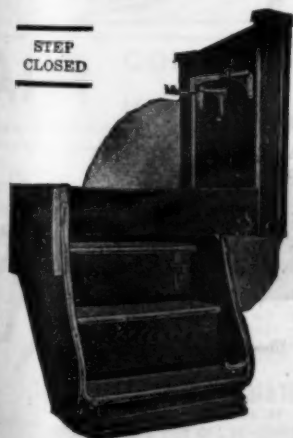
Also Hickory or Steel Axles, Skins, etc.

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Can be attached to any ordinary car step. Lowered when train stops and closed on starting, by simple mechanism on the platform. You can't let it down when train is in motion. Step goes up by closing trap door, by pressing foot on end of rod or by pressing rod with the hand while standing on ground. Step also closes if train moves three feet backward or forward, should the conductor neglect to close it. If anyone is standing on steps when train starts, step automatically unlocks and moves an inch or two, warning the person to get off. The step then closes when the person gets off, either to leave or get on the train.

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THE Mead-Morrison Orange Peel Grab combines a minimum of working parts with maximum durability, efficiency and capacity. The period of its service is prolonged indefinitely through the use of renewable bronze bushings and renewable steel digging points. Its use is a permanent economy.

Mead-Morrison Grabs are also made in Clam Shell and Special Types. Correspondence invited.

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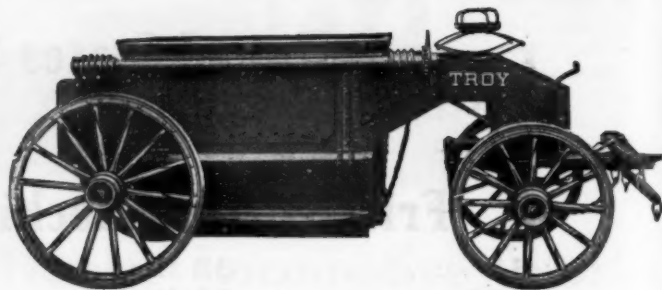
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FIXTURES.
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See it once and you can't be satisfied with any other Dump Wagon.

Teamsters, horses, owners—all are friends of the TROY Special. Let us tell *you* why you need it, too.

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The Troy Wagon Works Co.

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Only a "Hayward" Drag Scraper Bucket

can offer such features of superiority as *THESE!*

There are no rigid bails or bridles, and the Bucket cannot foul itself when it lands in a heap.

Hayward Drag Scraper Buckets *dig at any angle*, easily, smoothly, with none of the clumsily fitted, wedge-shaped pieces on bottom of bowl as on other buckets of this type.

Instead, the angle secured with a Hayward is caused by simply adjusting the Hauling or Dumping Bridle. *It takes two men less than three minutes* to bring about this change, making the bucket either a hard or a soft digging bucket.

The Hayward Drag Scraper Bucket has an open front, yet it is stronger than one built with a hooded front. There is no cross bracing either on a Hayward to prevent the bucket filling to its full capacity.

All wearing parts on Hayward Buckets are replaceable, and can be renewed at very slight cost.

On the strength of *these* superior points of merit, together with many others described in Pamphlet No. 576 which will be sent on request, you owe it to yourself to investigate Hayward Drag Scraper Buckets.

THE HAYWARD COMPANY

Orange Peel—Clam Shell Buckets
50 Church Street NEW YORK

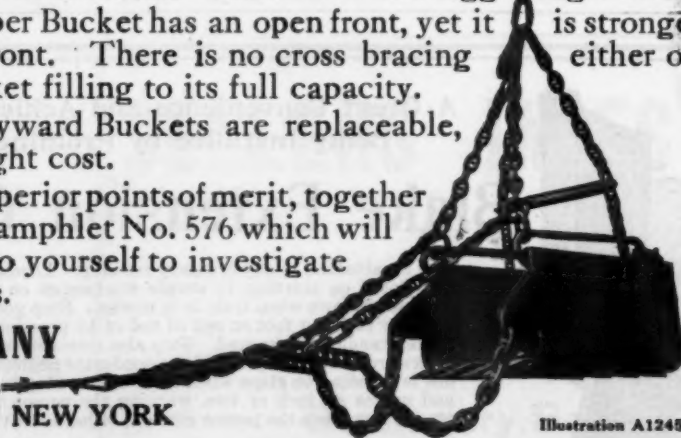
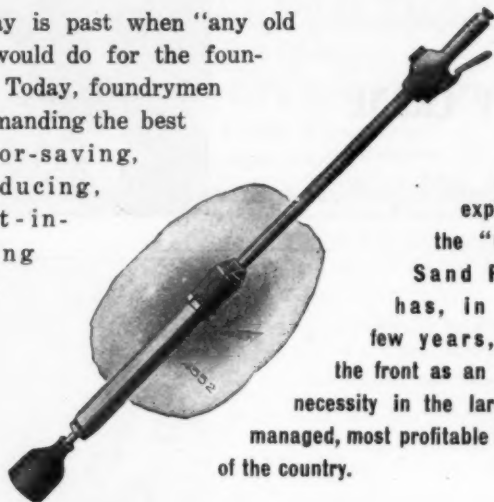


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FOR THE FOUNDRY

The day is past when "any old thing would do for the foundry." Today, foundrymen are demanding the best of labor-saving, cost-reducing, output-increasing tools.



And this explains why the "Crown" Sand Rammer has, in a very few years, come to the front as an economic necessity in the largest, best managed, most profitable foundries of the country.

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Offices in all Principal Cities of the World

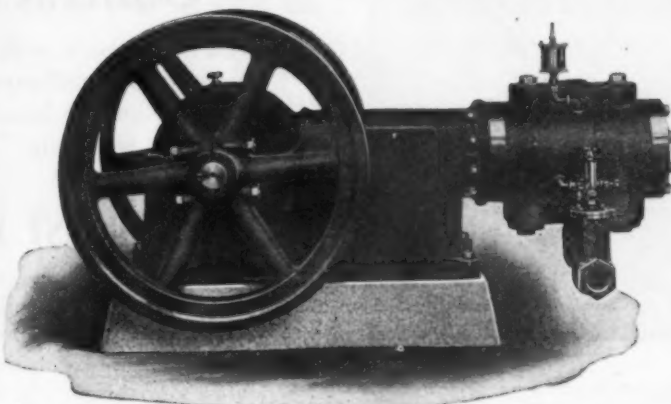
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THE ORIGINAL SELF-OILING COMPRESSOR BLAISDELL AIR COMPRESSORS

All types, all sizes, for every service.



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Blaisdell Strong Points

Lubrication is automatic and positive, starting and stopping with the machine without attention. Simple, effective, efficient. Frame entirely enclosed, dust-proof construction. Removable covers on frame allow easy access to all parts. Only best material used in the Blaisdell and each part thoroughly tested.

We also manufacture automatic sewage ejectors for buildings and municipalities, gas compressors, and vacuum cleaning systems.

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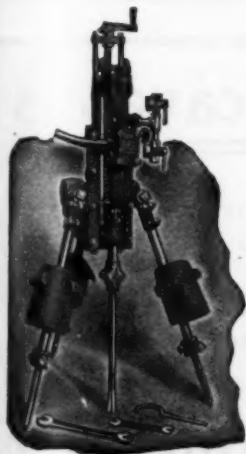
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Are built in a great variety of types and sizes. No compressor is suitable for all conditions, but for any set of conditions there is one compressor that is most efficient, durable and otherwise satisfactory.

With our experience we can help you select the best compressor for your particular requirements.

If you do not know our lines, write for bulletin L521-29A.

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"Peerless" AIR COMPRESSORS

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AIR COMPRESSORS IN ALL SIZES

FOR EVERY REQUIREMENT

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Represent the highest STANDARD in AIR TOOLS. The many advantageous features which these drills possess result in the greatest efficiency and have caused them to become the most popular machines of their kind on the market.

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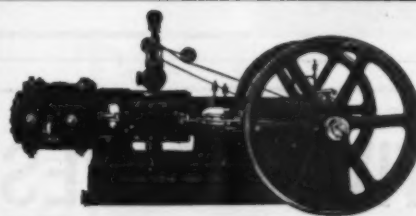
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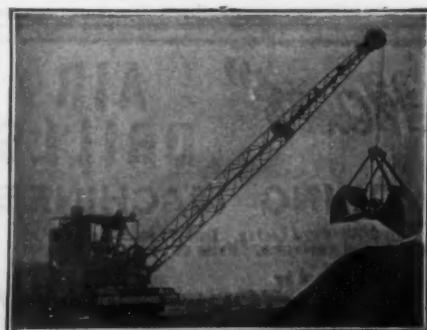


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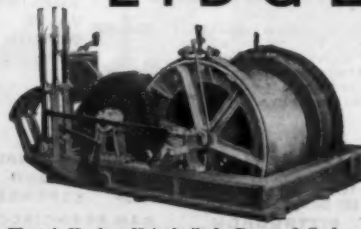
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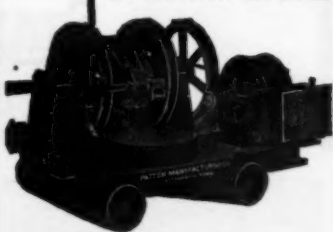


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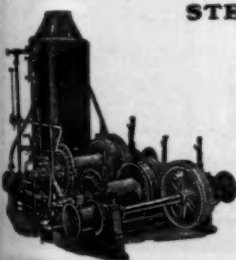
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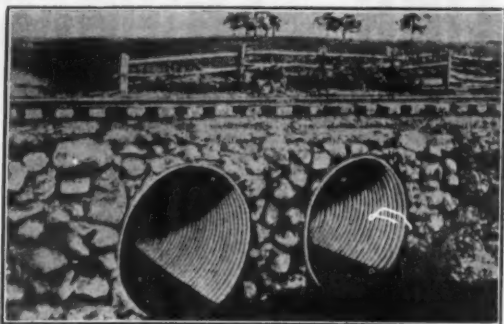
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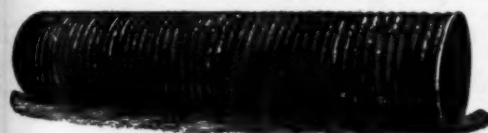
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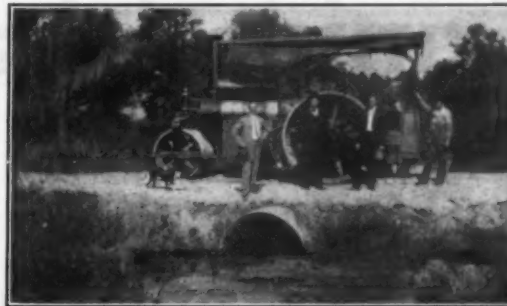
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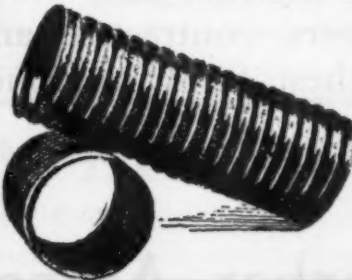
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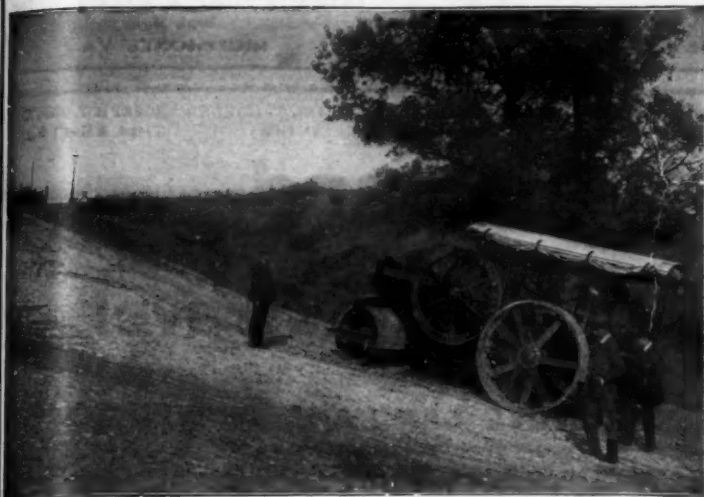
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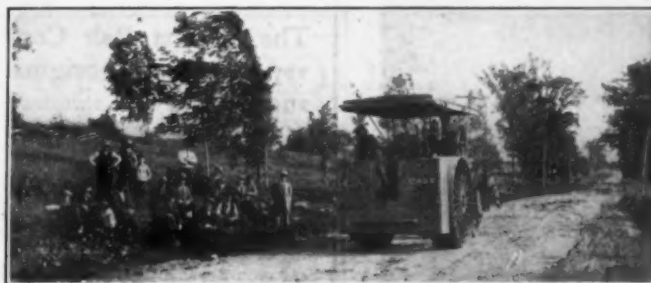
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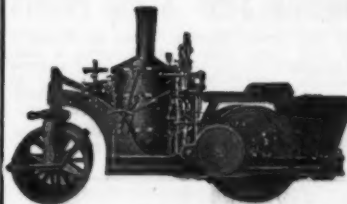
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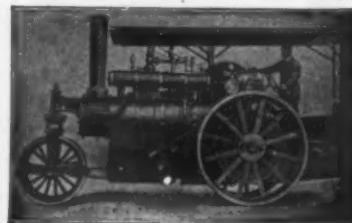
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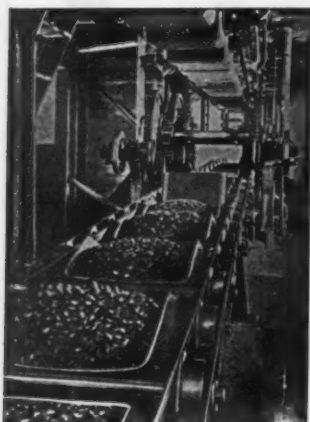
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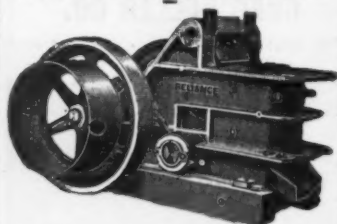
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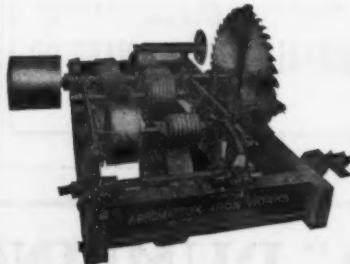
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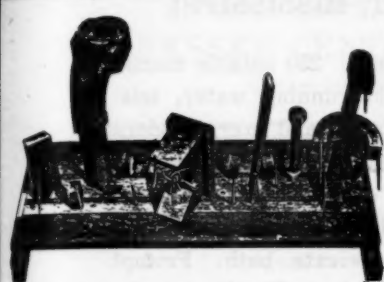
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FERTILIZER PLANTS

To Remove Scrap Iron From Any and All Materials

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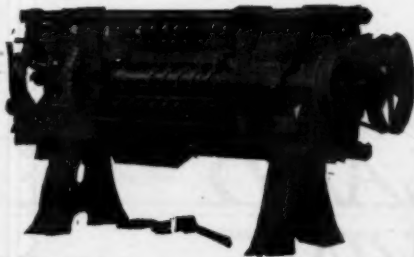
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are not installing the
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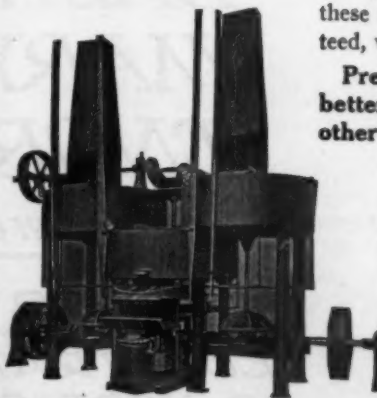
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IMPROVED

COOKING HEATERS

and you will be convinced that
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teed, viz:Prepare meal for presses
better and faster than any
other heater built.All heaters are
provided with
heavy cast-iron
bridge trees, with
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double scrapers or
stirrers.All heaters provided with pulleys, gears, scrapers,
cast iron tops, double gate steel apron slide charging
spouts, iron conveyor box with iron top.

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THE W. P. CALLAHAN CO.Inventors and Manufacturers of Complete
Oil Mill Equipments of All Capacities

REPRESENTATIVE

The De Marco Fulford Co., Atlanta, Ga.

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Do You Ever Issue a Catalogue?

The effect of a well-printed, well-arranged catalogue is so beneficial to the house issuing it that beyond any doubt it pays to get the best work.

We make a specialty of *high-class catalogue productions*.

Whenever you are in the market for anything of this kind, or any other kind of printed matter, give us a chance to estimate on your requirements.

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Summer's Winter Quarters

Come and enjoy all the novel varieties of healthful outdoor life, where it is

Summer from January till December

Fresh water and deep-sea fishing. Motoring on hard shell roads. Drives through piney woods. Hunting, sailing, bathing, tennis. Golf on a fine nine-hole course. Ideal climate. Sunny days.

The Great Southern Hotel

GULFPORT, MISSISSIPPI

Right on the beach. 250 outside rooms, with hot and cold running water, telephones, electric lights, and every modern convenience. Cozy, genial, homelike atmosphere. High standard of cleanliness. European plan. Rooms single or en suite, with or without private bath. Prompt and courteous service. Excellent cafe. Seafoods a specialty. Fresh vegetables from our own farm. Artesian water. Reasonable rates.

Write to W. N. DRIVER, Manager, Gulfport, Miss.

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**DESIGNERS-ENGRAVERS
ILLUSTRATIONS IN ONE
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Cities, Towns and Railroads Inviting Factories.

OPPORTUNITIES FOR CANNING FACTORIES

In a Land of Resources

No section of the South offers such exceptional opportunities for the establishment of Canning Factories as that traversed by the

TENNESSEE CENTRAL RAILROAD.

Every product of field, garden and orchard reaches perfection in Tennessee. Production is cheap and the yield enormous. Investigate.

RUTLEDGE SMITH, Industrial Agent

TENNESSEE CENTRAL RAILROAD

Cookeville, Tennessee

The Desirability of the South

AS THE BEST PLACE TO

Manufacture Cotton Goods

is illustrated in the increase of 67% quoted by Census Department.

We can offer attractive situations for those desiring to enter this field.

J. A. PRIDE

General Industrial Agent Seaboard Air Line Railway

NORFOLK, VIRGINIA

SAVANNAH, GEORGIA

Fertilizer Manufacturing Center of the South

AND SIXTH LARGEST CITY IN EXPORTS IN THE UNITED STATES

THE LAND OF OPPORTUNITY. I am now offering factory sites which have access to all four railroads entering Savannah, and situated on the Savannah River, the only available water front near the city.

I have also a few choice farming propositions with railroad and water transportation. Write me for information.

FRANK WHITNEY, Room 207 Germania Bank Bldg., SAVANNAH, GA.

THE West Point ROUTE

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THE WESTERN
RAILWAY OF ALABAMA

Offers excellent locations for
Truck, Fruit, Stock

And General Farming

Available Factory Sites. Abundance of Raw Material and Good Transportation Facilities.

Write for information.

R. E. LUTZ

General Agent

MONTGOMERY, ALABAMA

The Thriving Towns of Georgia

Offer opportunities and untold advantages for every line of business. Situated in the heart of the great COTTON BELT, in a country that is growing by leaps and bounds, and knows no hard times, they offer splendid inducements to merchants, manufacturers, professional men and every man that is willing to work. Correspondence solicited.

Georgia Bureau of Industries
& Immigration

714 Century Bldg.

Atlanta, Ga.

THE SOUTH'S "GARDEN SPOT" IS TRAVERSED BY THE ATLANTA, BIRMINGHAM & ATLANTIC RAILROAD

Lands are reasonable in price, very fertile and adaptable to the widest range of crops. Splendid climate and excellent church and school advantages. The territory is attracting general attention throughout the country.

Those desiring to locate will do well to communicate early. Inquiries are invited and literature treating fully with the population, soil conditions, etc., will be promptly mailed.

W. H. LEAHY

GENERAL PASSENGER AGENT

ATLANTA, GA.

MANUFACTORIES INVITED

Cheap Electric Power and Labor

Bedford City, Va., offers every advantage to industrial plants generally. Has cheap electric power which is very necessary to profitable manufacturing; has good supply of labor and ample raw material of various kinds within easy reach; and is on railroad connecting with all parts of the country and seaports. Good schools, churches, healthful climate and other facilities and comforts which make it a fine place of residence.

Detailed information gladly given by the

BOARD OF TRADE

BEDFORD CITY, VIRGINIA

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The Center of the Greatest Apple Development
in the United States

SPECIAL OPPORTUNITIES FOR

Cannery, Evaporating and Preserving Plants; Spray Material, Spray Wagons and Orchard Equipment Plants. Brick Plant wanted. On B. & O and Pa. Rys. Full information furnished.

J. E. Correll, Sec. Business Men's Asso., Winchester, Va.

Attractive Factory Sites

ON THE

ILLINOIS CENTRAL RAILROAD

For full particulars address the undersigned

Free books of information on farm lands issued by the
Illinois Central Railroad

ABOUT THE SOUTH

LOUISIANA RECLAIMED LANDS MAKE
FERTILE FARMS

THE YAZOO MISSISSIPPI VALLEY

LIVE STOCK INDUSTRY IN THE SOUTH

ALFALFA SUCCESSFULLY GROWN IN MISSISSIPPI

MADISON COUNTY, MISSISSIPPI

GRENADA COUNTY, MISSISSIPPI

TISHOMINGO COUNTY, MISSISSIPPI

TANGIPAHOA PARISH, LOUISIANA

WEST TENNESSEE

Everyone who would like a Southern home or investment should have a copy of one or all of these books. For free copies address

J. C. CLAIR

Industrial and Immigration Commissioner

ILLINOIS CENTRAL RAILROAD COMPANY

135 Park Row, CHICAGO, ILL.

Establish YOUR Business at the Base of Supplies

In Montgomery, Chattanooga, Rome, Atlanta, Macon, Columbus, Birmingham and a number of other cities and towns along the Central of Georgia Railway are factory sites which are ideal from every standpoint.

Your Iron, Coal, Coke, Timber and other raw materials are procurable at the lowest cost and in any quantities you need, as you need them, from immense supplies under your hand on every side. Efficient labor is plentiful, and water power abundant and inexpensive.

The prosperous, loyal community round about supplies a home market of great possibilities. Excellent shipping facilities open the whole country for promotion of sales on a successful competitive basis.

The progress that this district has made along industrial, commercial and agricultural lines during the past few years is but an indication of the prosperity that will mark its future. In it is the rational location for your factory. Any information you desire will be sent gladly and promptly upon request.

Address J. M. MALLORY
Savannah, Georgia
INDUSTRIAL AGENT

**CENTRAL OF GEORGIA
RAILWAY**

VIRGINIA
KENTUCKY
TENNESSEE

GEORGIA
No. CAROLINA
So. CAROLINA

To Manufacturers:

Substantial manufacturing concerns, especially those engaged in turning out steel, iron or wood products, requiring new sites and additional capital, will find it to their advantage to communicate with the undersigned.

An important city on the Southern Railway wants more factories, and offers inducements well worthy the consideration of any manufacturing company seeking a new location where there is abundant room, cheap coal, large timber supply, desirable labor, excellent point for distribution of product, and a charming residential place.

We welcome the opportunity to afford further information to responsible concerns. All correspondence and negotiations confidential. Refer to File 11,686. Write or call on

M. V. RICHARDS, Land and Industrial Agent
Southern Ry., Room 52, WASHINGTON, D. C.

FLORIDA
ALABAMA
MISSISSIPPI

SOUTHERN Ry.
Mobile & Ohio
GA. So. & FLA.

Equable
Climate

Texas City, Texas

Unlimited
Opportunities

If you are thinking of changing the location of your factory, or if you are thinking of locating a branch plant—then by all means investigate the situation at Texas City, Texas. The established steamship lines operating between Texas City, Mexico and the countries to the South, the transportation lines which tap the vast timber resources of the Southwest and which have their termini at this place, all enable the manufacturer who is located here, conveniently and economically to secure all the various hard and soft woods. These same transportation conveniences put him in direct communication with the markets of the world. A little investigation will disclose the fact that Texas City is

An Excellent Location For a Furniture or Piano Factory

Space forbids a lengthy enumeration of the many opportunities and advantages of this favored section. Statistics and general information will gladly be furnished to interested parties. Address

Texas City Transportation Co.

Texas City, Texas

Both Raw Material and Market for Crate, Box and Barrel Plants in Florida

In a recent advertisement on this page it was suggested that veneer package and barrel plants could be located in Florida with every assurance of certain success.

Facts were given that bear out the assertion that among the opportunities for profitable manufacture that are offered by the East Coast of this State, those for turning out boxes, barrels, crates and other veneer packages for the shipment of various products are especially inviting because of the immediate returns at good profit which they promise.

It is well known how remarkably the growing of fruits and vegetables in Florida for Northern markets is increasing and expanding year by year.

As an indication of this growth it is interesting to note that from one station last year there were shipped 2,500,000 crates of vegetables and 2,000,000 boxes of fruit, while from another point were sent out 300,000 barrels of potatoes.

Think what these figures indicate—that at these two points alone more than 4,500,000 boxes and crates and over 300,000 barrels will doubtless be needed during the present year.

Multiply these figures by ten and you will not then have the total that will be required for carrying the entire output of fruits and vegetables from the East Coast of Florida for the coming year.

There are some box, crate and barrel factories at several points along this railroad, but they are not able to supply the present and steadily growing demand, and their output must be supplemented by that of plants outside of the State until such time as local opportunities are utilized to meet local demands.

The timber used for these products in Florida is the native pine that grows in profusion all along the East Coast.

Much of this can be secured at a very low figure from those who are clearing their lands for farming, thus this territory is furnishing both the demand for the product and the raw material for supplying it.

Florida East Coast Railway

J. E. INGRAHAM, Vice-President

ST. AUGUSTINE, FLA.

A State and a Railroad

West Virginia by reason of her marvelous resources deserves as a business proposition all the publicity and co-operation in development the Baltimore & Ohio Railroad can give.

As the State prospers the railroad prospers.

And the valleys and the hills of West Virginia have been so favored by nature that the field for development in agriculture and manufacturing—from the production of the finest grade of commercial apples to the manufacture of everything needed by our civilization, is unlimited.

The Baltimore & Ohio Railroad has built and is maintaining a modern and complete railroad system. Its equipment from the ground up is the best that can be obtained, and the service it offers passengers and freight is of the highest class.

The Baltimore & Ohio Railroad is deeply interested in the broadest development of the agricultural and manufacturing potentialities of the country tributary to its lines.

*Through its Industrial Department it invites
investigation by person or by correspondence.*

Baltimore & Ohio Railroad

W. W. Wood, Industrial Agent

Baltimore, Md.

Clinchfield

An Empire in Possibilities

Abounding not only in rich resources in minerals, timber and water powers, but with a great cotton growing section of the South on the one hand and the teeming West on the other, the new country opened up by the Clinchfield is indeed an "Empire in Possibilities."

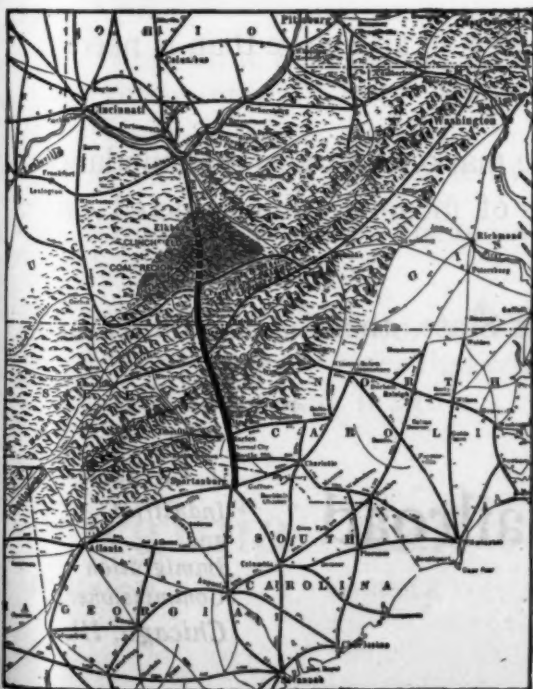
No other section close to the wonderful activities of a great nation can match in variety of opportunities this country where since the time of man its resources have lain practically dormant, due to a lack of rail-road facilities.

With the building of the Clinchfield, however, this rich country has been thrown open to the manufacturer, the investor and the farmer and the native people are likewise awakening to the opportunities before them.

New industries are being established, new settlers locating and on every hand can be seen indications pointing to the future greatness of this section as a center of industry and prosperity.

Investigations that have been made by experts especially employed by the Clinchfield, more than verify every claim that has been made as to the quality and extent of the mineral, timber, water power, agricultural and horticultural resources.

If you would take advantage of the opportunities offered in this new country, it is timely to investigate them now.



Any information desired will be gladly furnished, also a copy of our illustrated booklet "The Land of Opportunities" which briefly outlines this remarkable country.

Carolina, Clinchfield & Ohio Rwy.

"THE ROAD OF OPPORTUNITY"

J. J. Campion,
V.-P. and Traffic Manager

R. F. Brewer,
Industrial Agent

Johnson City, Tenn.

Splendid Openings for Diversified Clay Working Industries

Mississippi has extensive deposits of different varieties of high-grade clays that are especially suited for the manufacture of brick, pottery and tile.

None of these deposits, however, have been developed in keeping with their importance, and while some plants have been established in the State to manufacture various clay products, these have not been able to keep pace with the demand, and there is room for many more.

Realizing the value of its clay deposits the State has had special and careful investigations made by its Geological Survey.

The result of this work has been published in several volumes with a hope that a better knowledge of Mississippi's clay deposits would lead to a broader development of them.

In speaking of the possibilities of the pottery industry one of these reports states :

"The ceramic history of Mississippi has not been developed to that extent which is warranted by the quality and quantity of its resources. During the past few years there has been a decided improvement in our methods of brick manufacture with a corresponding increase in the quality of the ware. The manufacture of drain tile has been introduced, and the fact that we have clays suitable for its manufacture has been thoroughly demonstrated. In the manufacture of pottery, however, there has been little advance."

As the entire State is undergoing a rapid industrial and agricultural development and many new home-seekers are continually locating here, a great amount of new building and construction work of all kinds is continually being undertaken, and large quantities of brick and drain tile are being used.

Most of the materials are shipped from the outside, when all and more than is needed could be made within the State.

Mississippi offers not only a splendid and growing home market, but also an abundance of the raw materials for the establishment of a number of modern well-conducted clay working plants.

Considering the need for clay working plants in this State, these opportunities are worthy of careful investigation.

*Further facts
regarding
Mississippi
Clay Deposits
will be gladly
furnished.*

Illinois Central Railroad
Chicago, Ill.

*J. C. Clair,
Industrial
and
Immigration
Commissioner,
Chicago, Ill.*

Big Markets in Easy Reach OF Tidewater Virginia

One of the first things to be considered by the man who contemplates the location of a manufacturing plant is the matter of facilities for reaching the markets where his output will be in demand.

This means the best markets—those in which there will be the greatest demand, and in which competition can be met upon the most advantageous terms.

The cities of Tidewater Virginia—Richmond, Petersburg, Norfolk, Portsmouth—possess points of advantage in that respect that are well worth the consideration of manufacturers.

The Southern States have a combined population, as shown by the last census, of 27,529,853, and the number is being rapidly increased by the influx of new people, whose attention has been recently riveted upon that section as one endowed with special advantages for the enjoyment of health and the accumulation of riches.

In no other general division of the country is there so large a proportion of consumers to producers of manufactured articles, and therefore is there no other section that presents so inviting a market for such articles.

No other cities of the country present so many points of strategic importance with respect to that section as those of Tidewater Virginia, for both by rail and water they are brought into the closest communication with it, as well as with the North and the West and foreign lands.

Tidewater Virginia has the advantage of one of the greatest of the world's harbors, into which come vessels from all the world's ports and bound to all the world's ports—through it passes the trunk line railroads between the manufacturing centers of the North and the consuming section of the South—what more natural than that these cities should furnish locations for those who would intercept a portion of the trade heretofore enjoyed by those Northern cities and divert it to those of Tidewater Virginia?

These same cities are eligibly located with regard to the economical assembling of raw materials. The iron and coal of the Virginias, the timber of those States and North Carolina, naturally and cheaply flow to these Virginia cities, because they are so intimately connected with them by great transportation lines.

To these things add cheap power, and the conditions are ideal for profitable manufacturing industries.

The Virginia Railway and Power Company, operating in these cities, is prepared to furnish power at rates that will prove extremely attractive to manufacturers, and will gladly co-operate in other ways with those looking for locations for manufacturing plants.

Virginia Railway and Power Company

RICHMOND

NORFOLK

PETERSBURG

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SUFFOLK

VIRGINIA

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Abrasives Material Co., Philadelphia, Pa.
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Baltimore Audit Co., Baltimore, Md.
Cruselle Audit Co., Atlanta, Ga.
Interstate Audit Co., Washington, D. C.
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- Adding Machines.**
Adder Machine Co., Wilkes-Barre, Pa.
Burroughs Adding Machine Co., Detroit, Mich.
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- Agricultural Implements.**
Appomattox Iron Wks. & Sup. Co., Petersburg, Va.
Myers & Bro., F. E., Ashland, O.
- Air Compressor. (Stationary and Portable.)**
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American Air Compressor Wks., New York, N. Y.
American Compressor & Pump Co., Baltimore, Md.
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Chicago Pneumatic Tool Co., Chicago, Ill.
Gardner Governor Co., Quincy, Ill.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Union Steam Pump Co., Battle Creek, Mich.
- Air Motors.**
Ingersoll-Rand Co., New York, N. Y.
- Aluminum Products. (Bars, Sheets, Tubes, etc.)**
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- Aluminum Wheels.**
Norton Company, Worcester, Mass.
- Annealing Boxes.**
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- Anti-Friction Metals.**
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Dodge Manufacturing Co., Milwaukee, Ind.
Gilbert & Sons Brass Fdry. Co., St. Louis, Mo.
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Virginia Railway Supply Co., Norfolk, Va.
- Anti-Rail Creepers.**
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Starrett Co., L. S., Athol, Mass.
Weber & Co., F., Philadelphia, Pa.
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Chesapeake Iron Works, Baltimore, Md.
Des Moines Bridge & Iron Co., Des Moines, Ia.
Schreiber & Sons Co., The L., Cincinnati, O.
Snead Architectural Iron Works, Louisville, Ky.
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Biswanger & Co., Memphis, Tenn.
- Art Glass and Prisms. (Set in Zinc and Copper.)**
Spess Art Glass Co., G. A., St. Louis, Mo.
- Asbestos.**
Carolina Portland Cement Co., Charleston, S. C.
Johns-Manville Co., H. W., New York, N. Y.
Southern Pipe Covering Co., Inc., Richmond, Va.
- Asphalt.**
Armitage Mfg. Co., Richmond, Va.
Barber Asphalt Paving Co., Philadelphia, Pa.
Gulf Refining Co., Pittsburg, Pa.
Texas Co., The, New York, N. Y.
- Asphalt Melters.**
Steubner Iron Works, G. L., Long Island City, New York, N. Y.
- Asphalt Roofing and Siding. (Bird Sand and Chipped Slate Surfaced.)**
Birmingham & Seaman Co., Chicago, Ill.
- Automobiles. (Pleasure.)**
Interstate Automobile Co., Muncie, Ind.
- Automobiles. (Motor Trucks.)**
International Motor Co., New York, N. Y.
- Axles.**
[See Car Wheels, Axles and Trucks.]
- Babbitt Metal. [See Anti-Friction Metal.]**
- Badges. (Hat and Breast, Electric and Steam Road, Police and Fire Dept.)**
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- Bakers' Machinery.**
Lynn Superior Co., The, Cincinnati, O.
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Barr, J. H. C., Philadelphia, Pa.
Delaware Trust Co., Wilmington, Del.
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Halsey & Co., N. W., New York, N. Y.
Lisman & Co., F. J., New York, N. Y.
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New First National Bank, Columbus, O.
New York Bond & Share Co., New York, N. Y.
Nuveen & Co., John, Chicago, Ill.
Savannah Bank & Trust Co., Savannah, Ga.
Sieber & Co., H. F., Philadelphia, Pa.
Southern States Development Co., New York, N. Y.
Violet & Co., Atwood, New York, N. Y.
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First Nat'l Bank of Key West, Key West, Fla.
First National Bank, Richmond, Va.
Merchants National Bank, Baltimore, Md.
New First National Bank, Columbus, O.
National Exchange Bank, Baltimore, Md.
Savannah Bank & Trust Co., Savannah, Ga.
- Bank and Office Railings and Grilles. (Iron.)**
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Chattanooga Iron & Wire Wks., Chattanooga, Tenn.
Chesapeake Iron Works, Baltimore, Md.
Cincinnati Mfg. Co., Cincinnati, O.
Dow Wire Works, Louisville, Ky.
Dufur & Co., Baltimore, Md.
Dufur, Baggett & Co., Baltimore, Md.
Meyers Mfg. Co., F. J., Hamilton, O.
Ohio Elevator & Machine Co., The, Columbus, O.
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Concrete-Steel Co., The, New York, N. Y.
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Franklin Steel Co., Franklin, Pa.
Hoffman & Co., L. C., Baltimore, Md.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
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- Bearings. (Oilless.)**
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- Bearings. (Roller.)**
Hyatt Roller Bearing Co., Newark, N. J.
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- Bells. (Call.)**
Holtzer-Cabot Electric Co., Boston, Mass.
- Bells and Gongs.**
National Tube Co., Pittsburgh, Pa.
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- Belt. (Leather, Canvas, Rubber.)**
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Druid Oak Belting Co., Inc., Baltimore, Md.
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- Belt Dressing.**
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Clark Co., Geo. F., Windsor Locks, Conn.
De Laval Steam Turbine Co., Trenton, N. J.
General Electric Co., Schenectady, N. Y.
Green Fuel Economizer Co., Mattawan, N. Y.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Standard Blower & Metal Mfg. Co., Atlanta, Ga.
Sturtevant Co., B. F., Hyde Park, Mass.
- Blueprint Apparatus.**
Keuffel & Esser, Hoboken, N. J.
- Boilers.**
Abendroth & Root Mfg. Co., Newburg, N. Y.
Babcock & Wilcox Co., New York, N. Y.
Brownell Co., Dayton, O.
Cameron & Barkley Co., Charleston, S. C.
Casey-Hedges Co., Chattanooga, Tenn.
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.
Chicago Hose Wrecking Co., Chicago, Ill.
Cole Mfg. Co., R. D., Newnan, Ga.
Cooper Co., C. & G., Mt. Vernon, O.
Gem City Boiler Co., Dayton, O.
Gibbs Machinery Co., Columbus, S. C.
Hartley Boiler Works, Montgomery, Ala.
Heine Safety Boiler Co., St. Louis, Mo.
Keeler Co., E., Williamsport, Pa.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Lumbard Iron Works, Augusta, Ga.
Mecklenburg Iron Works, Charlotte, N. C.
Murray Iron Works Co., Burlington, Ia.
Oil City Boiler Co., Oil City, Pa.
Petroleum Iron Works, Sharon, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Price Machinery Co., S. M., Norfolk, Va.
Ruemmel-Dawley Mfg. Co., St. Louis, Mo.
Schiffeld & Sons Co., J. S., Macon, Ga.
Southern Engine & Boiler Works, Jackson, Tenn.
Union Iron Works Co., Selma, Ala.
Vaik & Murck Iron Works, Charleston, S. C.
Vogt Machine Co., Henry, Louisville, Ky.
Walsh & Weidner Boiler Co., Chattanooga, Tenn.
- Boiler Setting.**
Harrison-Walker Refractories Co., Pittsburgh, Pa.
- Boiler Tubes. [See Tubes, Boiler.]**
- Bolts, Nuts, Rivets, Studs and Washers.**
Milton Mfg. Co., Milton, Pa.
Nictown Plate Washer Co., Philadelphia, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
- Bonds. (Surety, etc.)**
Fidelity & Deposit Co., Baltimore, Md.
- Boring. (Cylinder.)**
Strickland Machine Co., Richmond, Va.
- Bottling Outfits.**
Vilter Mfg. Co., Milwaukee, Wis.
- Box Shooks.**
Naylor & Co., S. E., Gulfport, Miss.
- Brass Goods.**
Bailey-Lebby Co., Charleston, S. C.
Buckeye Iron & Brass Works, Dayton, O.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Powell Co., Wm., Cincinnati, O.
- Brazings. (Cast Iron.)**
Richmond Machine Works, Inc., Richmond, Va.
Strickland Machine Co., Richmond, Va.
- Brass Railings and Grilles, etc.**
McKenna Bros. Brass Co., Pittsburgh, Pa.
- Brewers' Machinery.**
Vilter Mfg. Co., Milwaukee, Wis.
- Brick. (Building.)**
Am. Enamelled Brick & Tile Co., New York, N. Y.
Brookhaven Pressed Brick & Mfg. Co., Brookhaven, Miss.
Carolina Portland Cement Co., Charleston, S. C.
Flake & Co., Inc., New York, N. Y.
Hood, B. Midlin, Atlanta, Ga.
Hydraulic Press Brick Co., St. Louis, Mo.
Oconee Brick & Tile Co., Milledgeville, Ga.
Pittsburgh-Buttler Co., Pittsburgh, Pa.
Sibley-Menge Brick & Coal Co., Birmingham, Ala.
Scott Brick Co., Alex. A., Knoxville, Tenn.
- Brick. (Blast Furnace, Coke Oven.)**
Ashland Fire Brick Co., Ashland, Ky.
Hood, B. Midlin, Atlanta, Ga.
- Brick. (Enamelled.)**
Amer. Enam. Brick & Tile Co., New York, N. Y.
- Brick. (Fire Clay.)**
Ashland Fire Brick Co., Ashland, Ky.
Brookhaven Pressed Brick & Mfg. Co., Brookhaven, Miss.
Flake & Co., Inc., New York, N. Y.
Harrison-Walker Refractories Co., Pittsburgh, Pa.
Kilian Fire Brick Works, Kilian, S. C.
Louisville Fire Brick Works, Highland Park, Ky.
Pomona Terra-Cotta Co., Pomona, N. C.
Stevens' Sons Co., H. C., Macon, Ga.
Taylor Sons Co., Chas., Cincinnati, O.
Union Mining Co., Mt. Savage, Md.
- Brick. (Magnesia.)**
Harrison-Walker Refractories Co., Pittsburgh, Pa.
- Brick. (Paving.)**
Carlyle Paving Brick Co., Portsmouth, O.
Copeland-Ingalls Shale Brick Co., Birmingham, Ala.
- Brick. (Refractory.)**
Harrison-Walker Refractories Co., Pittsburgh, Pa.
- Brick and Clayworking Machinery and Supplies.**
Carnell, George, Philadelphia, Pa.
Fennibolt Brick Machinery Co., St. Louis, Mo.
Frederick & Co., E. M., Gallatin, O.
Gibbs Machinery Co., Columbus, S. C.
Scott-Madden Iron Works, Keokuk, Ia.
Steele & Sons, J. C., Statesville, N. C.
Taplin-Rice-Clerkin Co., Akron, O.
- Brick Fireplaces. [See Fireplaces, Artistic Brick.]**
- Brick Machinery. (Sand Lime.) [See Sand-Lime Brick Machinery.]**
- Brickwork. (Artistic.)**
Flake & Co., Inc., New York, N. Y.
- Bridges. (Concrete.)**
Concrete Steel Engineering Co., New York, N. Y.
Roanoke Bridge Co., Roanoke, Va.
- Bridges. (Rolling Lift.)**
Scherzer Rolling Lift Bridge Co., Chicago, Ill.
- Bridges.**
American Bridge Co. of New York, New York, N. Y.
Belmont Iron Works, Inc., Philadelphia, Pa.
Champion Bridge Co., Wilmington, O.
Chicago Bridge & Iron Wks., Chicago, Ill.
Des Moines Bridge & Iron Co., Des Moines, Ia.
Farris Bridge Co., Pittsburgh, Pa.
Memphis Bridge Co., Memphis, Tenn.
Missouri Val. B'dge & Iron Co., Leavenworth, Kan.
Roanoke Bridge Co., Roanoke, Va.
Scherzer Rolling Lift Bridge Co., Chicago, Ill.
Vincennes Bridge Co., Vincennes, Ind.
Virginia Bridge & Iron Co., Roanoke, Va.
York Bridge Co., York, Pa.
- Bridge and Structural Iron Paints.**
Carolina Portland Cement Co., Charleston, S. C.
Chattanooga Paint Co., Chattanooga, Tenn.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Standard Paint Co., New York, N. Y.
- Brimstone.**
Union Sulphur Co., New York, N. Y.
- Briquetting Machinery. (Coal, Lignite, Ore.)**
Devillers, Robert, Brooklyn, N. Y.
- Brokers. (Custom-House, Import and Export.)**
Howard & Co., Savannah, Ga.
- Buckets. (Excavators.)**
Hayward Co., New York, N. Y.
Monaghan Mch. Co., Chicago, Ill.
Owen Bucket Co., Cleveland, O.
Stuebner Iron Works, G. L., Long Island City, New York, N. Y.
Williams Co., The G. H., Cleveland, O.
- Buckets. (Ore, etc.)**
Brown Holsting Mch. Co., Cleveland, O.
Caldwell & Sons Co., H. W., Chicago, Ill.
Dodge Manufacturing Co., Milwaukee, Ind.
Hayward Co., New York, N. Y.
Link-Belt Co., Nictown (Philadelphia), Pa.
Owen Bucket Co., Cleveland, O.
Smith Co., T. L., Atlanta, Ga.
Williams Co., The G. H., Cleveland, O.
- Buhr Stones.**
Starr Co., B. F., Baltimore, Md.
- Builders and Contractors.**
Falls City Construction Co., Louisville, Ky.
Farris Bridge Co., Pittsburgh, Pa.
Ferro Concrete Construction Co., Cincinnati, O.
Lisle-Dunning Const. Co., Oklahoma City, Okla.
Seiden-Breck Construction Co., St. Louis, Mo.
Unit Construction Co., St. Louis, Mo.
White & Co., J. G., New York, N. Y.
- Buildings. (Financed and Erected.)**
Falls City Construction Co., Louisville, Ky.
Gulf Coast Construction Co., Houston, Tex.
Lisle-Dunning Const. Co., Oklahoma City, Okla.
- Building Supplies.**
Armitage Mfg. Co., Richmond, Va.
Carolina Portland Cement Co., Charleston, S. C.
Chicago House Wrecking Co., Chicago, Ill.
Southeastern Lime & Cement Co., Charleston, S. C.
Southern Building Material Co., Norfolk, Va.
- Burial—Inserted Roofing and Siding. (Flexible Cement.)**
Birmingham & Seaman Co., Chicago, Ill.
- Burners. (Oil.) [See Fuel Oil Equipments.]**
- Bushings. (Oilless, for Loose Pullies.)**
North Amer. Metaline Co., Long Island City, N. Y.
- Cables.**
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Roebbing's Sons Co., John A., Trenton, N. J.
Williamson Wire Rope Co., Williamsport, Pa.
- Cableways. (Overhead Suspension.)**
Broderick & Bascom Rope Co., St. Louis, Mo.
Flory Mfg. Co., S. Bangor, Pa.
Lidgerwood Mfg. Co., New York, N. Y.
Mead-Morrison Mfg. Co., Cambridgeport, Mass.
Roebbing's Sons Co., John A., Trenton, N. J.
- Can and Box Making Machinery. (The.)**
Bliss Co., E. W., Brooklyn, N. Y.
- Cans.**
New Orleans Rfg. & Metal Wks., New Orleans, La.
Southern Can Co., Baltimore, Md.
- Canning Machinery and Supplies.**
Robins & Co., A. K., Baltimore, Md.
Sinclair-Scott Co., Baltimore, Md.
Sprague Canning Machinery Co., Chicago, Ill.
- Carborundum Paper and Cloth.**
Carborundum Co., Niagara Falls, N. Y.
- Card Clothing.**
American Supply Co., Providence, R. I.
- Cars. (Dump, Industrial, Logging and Mine.)**
Austin Mfg. Co., Chicago, Ill.
Baldwin Equipment & Supply Co., Chicago, Ill.
Chase Fdry. & Mfg. Co., Columbus, O.
Georgia Car & Locomotive Co., Atlanta, Ga.
Hunt Co., C. W., West New Brighton, N. Y.
Males Co., The, Cincinnati, O.
Oliver Mfg. Co., Wm. J., Knoxville, Tenn.
Raleigh Iron Works Co., Raleigh, N. C.
Smith Co., T. L., Atlanta, Ga.
Stuebner Iron Works, G. L., Long Island City, New York, N. Y.
Union Iron Works, Selma, Ala.
Western Wheeled Scraper Co., Aurora, Ill.
- Cars. (Passenger and Freight.) [See Railroad Equipment and Supplies.]**
- Car Couplers and Knuckles.**
Safety Car H't'g & L'ght'g Co., New York, N. Y.
- Car Lighting and Heating.**
Safety Car H't'g & L'ght'g Co., New York, N. Y.
- Car Steps. (Extension.)**
Blake Car Step Works, Charlotte, N. C.
- Car Wheels, Axles and Trucks.**
Carnegie Steel Co., Pittsburgh, Pa.
Oliver Mfg. Co., Wm. J., Knoxville, Tenn.
Union Iron Works, Selma, Ala.
- Casters.**
Clark Co., Geo. P., Windsor Locks, Conn.
- Castings. (Aluminum.)**
Aluminum Company of America, Pittsburgh, Pa.
- Castings. (Brass and Bronze.)**
Gilbert & Sons Brass Fdry. Co., A., St. Louis, Mo.
Keystone Bronze Co., Pittsburgh, Pa.
Phosphor-Bronze Smelting Co., Phila., Pa.
Richmond Machine Works, Inc., Richmond, Va.
Stratton & Bragg Co., Petersburg, Va.
Triumph Electric Co., Cincinnati, O.
- Castings. (Iron, Gray, etc.)**
Columbian Iron Works, Chattanooga, Tenn.
Gibbs Machinery Co., Columbus, S. C.
Georgia Car & Locomotive Co., Atlanta, Ga.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
McWane Pipe Works, Lynchburg, Va.
Powell Engineering & Machine Co., Baltimore, Md.
Roanoke Iron Works, Inc., Roanoke, Va.
Robins Conveying Belt Co., New York, N. Y.
Ross-Meehan Foundry Co., Chattanooga, Tenn.
Stratton & Bragg Co., Petersburg, Va.
U. S. Cast Iron Pipe & Fdy. Co., New York, N. Y.
Vale & Murdock Iron Works, Charleston, S. C.
Westbrook Elevator Co., Danville, Va.
- Castings. (Malleable Iron and Steel.)**
Missouri Malleable Iron Co., East St. Louis, Ill.
- Castings. (Steel.)**
Crucible Steel Castings Co., Lansdowne, Pa.
Hoffman & Co., R. C., Baltimore, Md.
Reliance Steel Casting Co., Pittsburgh, Pa.
- Ceilings. (Metal.)**
Chattanooga Mfg. & Fdy. Co., Chattanooga, Tenn.
Edwards Manufacturing Co., Cincinnati, O.
Harry Steel Co., O. K., St. Louis, Mo.
Keighley Metal Cell. & Mfg. Co., S. Pittsburgh, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
- Cement.**
Alpha Portland Cement Co., Easton, Pa.
American Cement Co., Philadelphia, Pa.
Carolina Portland Cement Co., Charleston, S. C.
Clinchfield Portland Cem. Corp., Kingsport, Tenn.
Frisbie Portland Cement Co., Chattanooga, Tenn.
Hartman Portland Cement Co., Wm. G., Philadelphia, Pa.
Ironport Portland Cement Co., Ironport, O.
Kirkpatrick Sand & Cem. Co., Birmingham, Ala.
Kosmos Portland Cement Co., Louisville, Ky.
Lehigh Portland Cement Co., Allentown, Pa.
Security Cement & Lime Co., Baltimore, Md.
Southeastern Lime & Cement Co., Charleston, S. C.
Southern States Portland Cement Co., Rockmart, Ga.
Standard Portland Cement Co., Leeds, Ala.
Tidewater Portland Cement Co., Baltimore, Md.
- Cement. (Liquids.)**
Glidden Varnish Co., Cleveland, O.
- Cement Machinery.**
Aising Engineering Co., J. R., New York, N. Y.
Power & Mining Machinery Co., Cudahy, Wis.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
- Chain Blocks.**
Ford Chain Block & Mfg. Co., Philadelphia, Pa.
- Chains. (Dredge, Quarry, Steam Shovel.)**
Weimer Chain & Iron Co., Lebanon, Pa.
- Channeles.**
Ingersoll-Rand Co., New York, N. Y.
- Checks, Metal. (Factory, Time and Merchandise.)**
American Railway Supply Co., New York, N. Y.
- Chemical and Drug Machinery.**
Campbell, P. F., Philadelphia, Pa.
- Chemists.**
Burn, Harry, Birmingham, Ala.
Davis, Geo. C., Philadelphia, Pa.
Froehling & Robertson, Richmond, Va.
McKenna, Dr. Chas. F., New York, N. Y.
Payne, Jas. H., Yorktown, Va.
- Chimneys. (Steel-Concrete.)**
Specialty Eng. Co., Houston, Tex.
Weber Chimney Co., Chicago, Ill.
- Chloride Accumulator.**
Electric Storage Battery Co., The, Phila., Pa.
- Chucks.**
Morse Twist Drill & Mch. Co., New Bedford, Mass.

Cities and Towns. (Commercial and Industrial Opportunities.) [See Industrial, Agricultural and Commercial Opportunities.]**Clayworking Machinery.** [See Brick and Clayworking Machy. and Supplies.]**Cleansing Compound.** (Floors, etc.)**Coal.** (Time Recorders.)**Clocks.** (Watchman.)**Hoist-Cable Electric Co., Boston, Mass.****Kaiser, Louis E., Baltimore, Md.****Clutches.****Dodge Manufacturing Co., Mishawaka, Ind.****Positive Clutch & Pulley Works, Buffalo, N. Y.****Coal.****Alabama Coal & Iron Co., Birmingham, Ala.****Cliffhield Coal Corp., Spartanburg, S. C.****Cliffhield Fuel Co., Spartanburg, S. C.****Consolidated Coal Co., Inc., New York, N. Y.****Flat Top Fuel Co., Bluefield, W. Va.****Pittsburgh-Buffalo Co., Pittsburgh, Pa.****Tennessee Coal, Iron & R. R. Co., B'ing'm, Ala.****Coal Briquetting Machinery.****Devillers, Robert, Brooklyn, N. Y.****Coal Cutters.****Ingersoll-Rand Co., New York, N. Y.****Jeffrey Mfg. Co., Columbus, O.****Coal Handling Machinery.****Bartlett & Snow Co., C. O., Cleveland, O.****Brown Hoisting Mch. Co., Cleveland, O.****Byard Co., New York, N. Y.****Heat Co., C. W., West New Brighton, N. Y.****Jeffrey Mfg. Co., Columbus, O.****Link-Belt Co., Nicetown (Philadelphia), Pa.****Meacham-Morrison Mfg. Co., Cambridgeport, Mass.****Robins Conveying Belt Co., New York, N. Y.****Williams Co., The G. H., Cleveland, O.****Coal Tar and By-Products.****Barrett Mfg. Co., Philadelphia, Pa.****Carolina Portland Cement Co., Charleston, S. C.****Coke.****Alabama Coal & Iron Co., Birmingham, Ala.****Flat Top Fuel Co., Bluefield, W. Va.****Pittsburgh-Buffalo Co., Pittsburgh, Pa.****Burgess, Brown & Co., Cincinnati, O.****Tennessee Coal, Iron & R. R. Co., B'ing'm, Ala.****Concrete Construction.** (Steel Reinforcement.)**American Steel & Wire Co., Chicago, Ill.****Brown Hoisting Machinery Co., Cleveland, O.****Concrete-Steel Co., The, New York, N. Y.****Concrete Steel Engineering Co., New York, N. Y.****Ferro Concrete Construction Co., Cincinnati, O.****Frederick-Craig-Grout Co., Nashville, Tenn.****Jeffrey Mfg. Co., Columbus, O.****Reichert Mfg. Co., Milwaukee, Wis.****Specialty Eng. Co., Houston, Tex.****Walt Construction Co., St. Louis, Mo.****Concrete Curb Protection.** (Steel.)**Steel Protected Concrete Co., Philadelphia, Pa.****Concrete Dams.****Amburn Hydraulic Const. Co., Boston, Mass.****Hydraulic Properties Co., New York, N. Y.****Concrete Floor Dressing.** (Waterproof.)**Glidden Varnish Co., Cleveland, O.****Concrete Forms.** (Metal.)**Reichert Mfg. Co., Milwaukee, Wis.****Concrete Mixers.****Carolina Portland Cement Co., Charleston, S. C.****Jeffrey Mfg. Co., Columbus, O.****Marshall-Capron Mfg. Co., Chicago, Ill.****Milwaukee Concrete Mixer & Mch. Co., Milwaukee, Wis.****Smith Co., T. L., Atlanta, Ga.****Standard Scale & Supply Co., Pittsburgh, Pa.****Waterloo Cement Mch. Co., Waterloo, Ia.****Concrete Pile.** (Corrugated.)**The Underground Const. Co., St. Louis, Mo.****Concrete Reinforcing Bars.****Carnegie Steel Co., Pittsburgh, Pa.****Concrete-Steel Co., The, New York, N. Y.****Concrete Steel Engineering Co., New York, N. Y.****Franklin Steel Co., Franklin, Pa.****Concrete Tiles.****Universal Concrete Tile Co., New Orleans, La.****Condensers.****Alger Condenser Co., New York, N. Y.****Don Bros. Steam Pump Wks., Indianapolis, Ind.****Westinghouse Machine Co., Pittsburgh, Pa.****York Mfg. Co., York, Pa.****Conductor Pipe.****Edwards Mfg. Co., Cincinnati, O.****Honey & Co., C. G., Pittsburgh, Pa.****Milwaukee Corrugating Co., Milwaukee, Wis.****Contractors.** (Hydro-Electric Developments.)**Multiple Arch Hyd. Cons. Co., Ltd., Spartanburg, S. C.****Contractors' Machinery and Supplies.** [See also Hoisting Machinery.]**American Engineering Co., Philadelphia, Pa.****American Hoist & Derrick Co., St. Paul, Minn.****American Locomotive Co., New York, N. Y.****Amth Mfg. Co., Chicago, Ill.****Case Threshing Mch. Co., J. I., Racine, Wis.****Clyde Iron Works, Duluth, Minn.****Contractors' Plant Mfg. Co., Ltd., Buffalo, N. Y.****Exeter Machine Works, Pittston, Pa.****Flay Mfg. Co., S., Bangor, Pa.****Hyde Bros. & Co., New York, N. Y.****Ingersoll-Rand Co., New York, N. Y.****Latent W. J., New York, N. Y.****Males Co., The, Cincinnati, O.****Marine Metal & Supply Co., New York, N. Y.****Mayland Equipment & Supply Co., Baltimore, Md.****Meacham-Morrison Mfg. Co., Cambridgeport, Mass.****Morgan Mch. Co., Chicago, Ill.****Oliver Mfg. Co., Wm. J., Knoxville, Tenn.****Owen Bucket Co., Cleveland, O.****Pickett Co., Inc., H. W., Philadelphia, Pa.****Pipe & Contractors' Supply Co., New York, N. Y.****Robins Conveying Belt Co., New York, N. Y.****Smith Co., T. L., Atlanta, Ga.****Stromberg, Iron Works, G. L., Long Island City, New York, N. Y.****Conveying Machinery.****Bartlett & Snow Co., Cleveland, O.****Brown Hoisting Mch. Co., Cleveland, O.****Goldwell & Son Co., H. W., Chicago, Ill.****Dodge Manufacturing Co., Mishawaka, Ind.****Flay Mfg. Co., S., Bangor, Pa.****Byard Co., New York, N. Y.****Heat Co., C. W., West New Brighton, N. Y.****Jeffrey Mfg. Co., Columbus, O.****Lidgerwood Mfg. Co., New York, N. Y.****Link-Belt Co., Nicetown (Philadelphia), Pa.****Meacham-Morrison Mfg. Co., Cambridgeport, Mass.****McLanahan-Stone Mach. Co., Hollidaysburg, Pa.****Robins Conveying Belt Co., New York, N. Y.****Cooling Towers.****Alger Condenser Co., New York, N. Y.****Donnell-Dawley Mfg. Co., St. Louis, Mo.****Cordage.****American Mfg. Co., New York, N. Y.****Broderick & Bascom Rope Co., St. Louis, Mo.****Columbian Rope Co., Auburn, N. Y.****Plymouth Cordage Co., North Plymouth, Mass.****Turner Co., J. Spencer, New York, N. Y.****Whitlock Cordage Co., New York, N. Y.****Cordage Machinery.****Haskell-Dawes Machinery Co., Boston, Mass.****Corn-Mill Machinery.****Nordyke & Marmon Co., Indianapolis, Ind.****Raymond Bros. Impact Pulv. Co., Chicago, Ill.****Starr Co., B. F., Baltimore, Md.****Wolf Co., Chambersburg, Pa.****Cotton Duck.****Turner Co., J. Spencer, New York, N. Y.****Cotton Oil and Products.****American Cotton Oil Co., New York, N. Y.****Cotton Yarns.** (Commission Merchants.)**Paulson, Linkroum & Co., New York, N. Y.****Cotton-Gin Machinery.****Carver Cotton Gin Co., East Bridgewater, Mass.****Continental Gin Co., Birmingham, Ala.****Gibbs Machinery Co., Columbia, S. C.****Van Winkle Gin & Machine Co., Atlanta, Ga.****Cotton-Mill Machinery.****American Mach. & Mfg. Co., Charlotte, N. C.****American Supply Co., Providence, R. I.****Draper Co., Hopedale, Mass.****Kitsum Machine Shop, Lowell, Mass.****Lowell Machine Shop, Lowell, Mass.****Mason Machine Works, Tauton, Mass.****Saco-Pettie Co., Newton Upper Falls, Mass.****Whitins Machine Works, Whitinsville, Mass.****Whitinsville Spig'g King Co., Whitinsville, Mass.****Cotton-Mill Supplies.****American Supply Co., Providence, R. I.****Whitinsville Spig'g King Co., Whitinsville, Mass.****Cottonseed-Oil Machinery.****Buckeye Iron & Brass Works, Dayton, O.****Burruss Engineering Co., Atlanta, Ga.****Callahan Co., W. F., The, Dayton, O.****Cardwell Machine Co., Richmond, Va.****Carver Cotton Gin Co., East Bridgewater, Mass.****Continental Gin Co., Birmingham, Ala.****Raymond Bros. Impact Pulv. Co., Chicago, Ill.****Van Winkle Gin & Machine Co., Atlanta, Ga.****Couplings.****American Spiral Pipe Works, Chicago, Ill.****Brown Co., A. & F., New York, N. Y.****Caldwell Co., Inc., W. E., Louisville, Ky.****Dodge Manufacturing Co., Milwaukee, Ind.****Goldens Foundry & Machine Co., Columbus, Ga.****Sinclair Scott Co., Baltimore, Md.****Wood's Sons, T. B., Chambersburg, Pa.****Couplings.** (Car.)**Weimer Chain & Iron Co., Lebanon, Pa.****Couplings.** (Hose, Air, Gas, Steam and Water.)**National Tube Co., Pittsburgh, Pa.****Coverings.** (Pipe, Boiler, etc.)**Carolina Portland Cement Co., Charleston, S. C.****Johns-Manville Co., H. W., New York, N. Y.****Southern Pipe Covering Co., Inc., Richmond, Va.****Cranes.** (Locomotive.)**American Hoist & Derrick Co., St. Paul, Minn.****Brown Hoisting Machinery Co., Cleveland, O.****Exeter Machine Works, Pittston, Pa.****Ohio Locomotive Crane Co., Bucyrus, O.****Cranes.** (Traveling, Hand, Power, Hydraulic.)**Brown Hoisting Machinery Co., Cleveland, O.****Hayward Co., New York, N. Y.****Lane Mfg. Co., Montpelier, Vt.****Northern Engineering Works, Detroit, Mich.****Speidel, J. G., Reading, Pa.****Crayons.****Lowell Crayon Co., Lowell, Mass.****Crematories.** (Garbage.)**Specialty Eng. Co., Houston, Tex.****Crescotes.****Carolina Portland Cement Co., Charleston, S. C.****Crescote Oil.****Atlantic Turpentine & Ref'n'g Co., Savannah, Ga.****Crescoted Wood Block.** (Contractors for Laying.)**Crescoted Wood Block Pav. Co., New Orleans, La.****Crescoting Works.****Gulport Crescoting Co., Gulport, Miss.****Internat'l Crescoting & Cons. Co., Galveston, Tex.****National Lumber & Cresc. Co., Texarkana, Ark.****Southern Crescoting Co., Ltd., Slidell, La.****Southern Wood Preserving Co., Atlanta, Ga.****Crossarms and Pins.****Carolina Electrical Co., Raleigh, N. C.****Northern Crescoting Co., Ltd., Slidell, La.****Western Electric Co., New York, N. Y.****Crossings.** [See Railroad Frogs and Switches.]**Crossing Machine.****Standard Cross Tie Mch. Co., New Orleans, La.****Crossties.****Internat'l Crescoting & Cons. Co., Galveston, Tex.****Naylor & Co., S. B., Gulport, Miss.****Southern Crescoting Co., Ltd., Slidell, La.****Universal Concrete Tie Co., New Orleans, La.****Crossties.** (Reinforced Concrete.)**Universal Concrete Tie Co., New Orleans, La.****Crossties.** (Steel.)**Carnegie Steel Co., Pittsburgh, Pa.****Crushers.** (Corn and Cob.)**Gardner Crusher Co., New York, N. Y.****Jeffrey Mfg. Co., Columbus, O.****Raymond Bros. Impact Pulv. Co., Chicago, Ill.****Williams Pat. Crusher & Pulv. Co., Chicago, Ill.****Crushers.** (Rock.)**Austin Mfg. Co., Chicago, Ill.****Case Threshing Mch. Co., J. I., Racine, Wis.****Crescon Co., Geo. V., Philadelphia, Pa.****Gardner Crusher Co., New York, N. Y.****Power & Mining Machinery Co., Cudahy, Wis.****Pratt Engineering & Mach. Co., Atlanta, Ga.****Raymond Bros. Impact Pulv. Co., Chicago, Ill.****Walker & Elliott, Wilmington, Del.****Williams Pat. Crusher & Pulv. Co., Chicago, Ill.****Western Wheelbarrow Scraper Co., Aurora, Ill.****Crushing and Pulverizing Machinery.****Alasing Engineering Co., J. E., New York, N. Y.****Austin Mfg. Co., Chicago, Ill.****Bartlett & Snow Co., C. O., Cleveland, O.****Crescon Co., Geo. V., Philadelphia, Pa.****Gardner Crusher Co., New York, N. Y.****Jeffrey Mfg. Co., Columbus, O.****McLanahan-Stone Mach. Co., Hollidaysburg, Pa.****Power & Mining Machinery Co., Cudahy, Wis.****Pratt Engineering & Mach. Co., Atlanta, Ga.**

- Engineers—**
GAS.
Len, Henry L., Chicago, Ill.
- GEOLOGICAL.**
Bureau of Assoc. Geological Engineers, Boston, Mass.
Davis, Geo. C., Philadelphia, Pa.
Fohn, F. Julius, Lexington, Ky.
Froehling & Robertson, Richmond, Va.
- HYDRAULIC, SANITARY AND SEWERAGE.**
Brindley Co., New York, N. Y.
Brown, S. D., Chattanooga, Tenn.
Burgwyn, C. P. E., Richmond, Va.
Harlow Co., James H., Baltimore, Md.
Hutton, T. Chalkley, Wilmington, Del.
Leete-Maupin Engineering Co., Huntington, W. Va.
Manning-Hughes Co., Charlotte, N. C.
McCrory Co., Inc., The J. B., Atlanta, Ga.
Multiple Arch Hydraulic Const. Co., Ltd., Spar-tanburg, S. C.
Myers, E. W., Greensboro, N. C.
Pew, Arthur, Atlanta, Ga.
Specialty Eng. Co., Houston, Tex.
Tucker & Laxton, Charlotte, N. C.
- ICE AND REFRIGERATING.**
Hague, John, St. Louis, Mo.
Taft-Nordmeyer Eng. Co., St. Louis, Mo.
- ILLUMINATING.**
Holophane Co., Newark, O.
- LANDSCAPE.**
Drane, Brent S., Charlotte, N. C.
Reding & Howard, Baltimore, Md.
- REINFORCED CONCRETE CONSTRUCTION, BUILD-INGS, BRIDGES, ETC.**
Concrete Steel Engineering Co., New York, N. Y.
Gardner & Howe, Memphis, Tenn.
- WATER-WORKS.**
Burgwyn, C. P. E., Richmond, Va.
Myers, E. W., Greensboro, N. C.
- Engines.**
GAS AND GASOLINE.
Blaisdell Machinery Co., Bradford, Pa.
Bogart Gas Power Eng. Co., Buffalo, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Heer Engine Co., Portsmouth, O.
Mietz, A., New York, N. Y.
Novo Engine Co., Lansing, Mich.
Otto Gas Engine Works, Philadelphia, Pa.
Power Mfg. Co., Lima, O.
Standard Gas Power Co., Atlanta, Ga.
Westinghouse Machine Co., The, Pittsburgh, Pa.
- OIL.**
Covington Mch. Co., New York, N. Y.
Mietz, A., New York, N. Y.
Power Mfg. Co., Lima, O.
- Engines. (Steam.)**
Allis-Chalmers Co., Milwaukee, Wis.
American Blower Co., Detroit, Mich.
American Engine Co., Bound Brook, N. J.
American Hoist & Derrick Co., St. Paul, Minn.
Atlas Engine Works, Indianapolis, Ind.
Ball Engine Co., Erie, Pa.
Brownell Co., The, Dayton, O.
Buffalo Forge Co., Buffalo, N. Y.
Cameron & Barkley Co., Charleston, S. C.
Chicago House Wrecking Co., Chicago, Ill.
Cooper Co., C. & G., Mt. Vernon, O.
Engberg's Elect. & Mech. Wks., St. Joseph, Mich.
Gibbs Machinery Co., Columbia, S. C.
Greenwald Co., J. & E., Cincinnati, O.
Griffith & Wedge Co., The, Zanesville, O.
Harrisburg Fdy. & Mach. Wks., Harrisburg, Pa.
Hooven, Owen, Rentchler Co., Hamilton, O.
Houston, Stanwood & Gamble Co., Cincinnati, O.
Lefel & Co., James, Springfield, O.
Lombard Iron Works, Augusta, Ga.
Mecklenburg Iron Works, Charlotte, N. C.
Morris Machine Works, Baldwinville, N. Y.
Murray Iron Works Co., Burlington, Ia.
Oil City Boiler Co., Oil City, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Price Machinery Co., S. M., Norfolk, Va.
Ridgway Dynamo & Engine Co., Ridgway, Pa.
Scheldt's Sons Co., J. S., Macon, Ga.
Smith-Courtney Co., Richmond, Va.
Southern Engine & Boiler Works, Jackson, Tenn.
Sturtevant Co., B. F., Hyde Park, Mass.
Union Iron Works Co., Selma, Ala.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Machine Co., Pittsburgh, Pa.
- Envelope Sealer and Stamper.**
Commercial Sales & Mfg. Co., Oberlin, O.
- Envelopes.**
Young & Selden Co., Baltimore, Md.
- Excavating Machinery. (Steam Shovels, etc.)**
American Locomotive Co., New York, N. Y.
American Steel Dredge Co., Ft. Wayne, Ind.
Baldwin Equipment & Supply Co., Chicago, Ill.
Bucyrus Co., So. Milwaukee, Wis.
Cable Excavator Co., Philadelphia, Pa.
Fairbanks Steam Shovel Co., Marion, O.
Hayward Co., New York, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Lidgerwood Mfg. Co., New York, N. Y.
Males Co., Cincinnati, O.
Marion Steam Shovel Co., Marion, O.
Monaghan Machine Co., Chicago, Ill.
Norborn Engineering Co., Philadelphia, Pa.
Owen Bucket Co., Cleveland, O.
Williams Co., The G. H., Cleveland, O.
- Excelsior Machinery.**
Kline, Lewis T., Alpena, Mich.
- Exhaust Heads.**
Abendroth & Root Mfg. Co., Newburg, N. Y.
American Spiral Pipe Works, Chicago, Ill.
Greenwald Co., J. & E., Cincinnati, O.
Hoppes Mfg. Co., Springfield, O.
- Exhibits. (Machinery Builders' Equipment and Supplies.)**
Bourse, The, Philadelphia, Pa.
Builders' Exchange, Baltimore, Md.
- Expansion Joints.**
Alberger Condenser Co., New York, N. Y.
Badger & Sons Co., E. B., Boston, Mass.
- Explosives.**
du Pont de Nemours Powder Co., E. I., Wilming-ton, Del.
- Extension Steps. (For Railroad Coaches.)**
Blake Car Step Works, Charlotte, N. C.
- Factory Sites. (Town and Railroad.)** [See In-dustrial, Agricultural and Commercial Op-portunities.]
- Fans. (Electric.)**
Bates & Bros. Co., D. L., Dayton, O.
General Electric Co., Cleveland, N. Y.
Robbins & Myers Co., Springfield, O.
Western Electric Co., New York, N. Y.
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.
- Fans. (Ventilating.)** [See Blowers, Exhaust Fans.]
- Fans. (Water and Belt Driven.)**
Bates & Bros. Co., D. L., Dayton, O.
- Fastener Driving Machine. (Corrugated Joint.)**
Sarance Machine Co., St. Joseph, Mich.
- Feed-Water Heaters and Purifiers.**
Alberger Condenser Co., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
Blake & Knowles Steam Pump Works, New York, N. Y.
- Brownell Co., Dayton, O.
Exeter Machine Works, Pittston, Pa.
Gibbs Machinery Co., Columbia, S. C.
Greenwald Co., J. & E., Cincinnati, O.
Hoppes Mfg. Co., Springfield, O.
McAdoo, Thomas, Philadelphia, Pa.
Murray Iron Works Co., Burlington, Ia.
National Pipe Bending Co., New Haven, Conn.
Seville & Sons Co., Wm. B., Pittsburgh, Pa.
Stewart Heater Co., Buffalo, N. Y.
Wilmington Iron Works, Wilmington, N. C.
- Feed-Water Heater and Purifier and Oil Separator Combined.**
Blake & Knowles Steam Pump Works, New York, N. Y.
Stewart Heater Co., Buffalo, N. Y.
- Felt. (Building, Sheathing.)**
Barrett Mfg. Co., Philadelphia, Pa.
- Fencing, Entrance Gates. (Iron, Steel, Wire.)**
American Steel & Wire Co., Chicago, Ill.
Bolles Iron & Wire Works, J. E., Detroit, Mich.
Dow Wire Works, Louisville, Ky.
Dufur & Co., Baltimore, Md.
New Jersey Wire Cloth Co., Trenton, N. J.
Ohio Elevator & Mach. Co., The, Columbus, O.
- Fertilizer Machy. (See also Phosphate Machy.)**
Campbell, P. F., Philadelphia, Pa.
Pratt Eng. & Mch. Co., Atlanta, Ga.
Smith Co., T. L., Atlanta, Ga.
Valk & Murdock Iron Works, Charleston, S. C.
Walker & Elliott, Wilmington, Del.
- Files.**
Barnett Co., G. & H., Philadelphia, Pa.
Delta File Works, Philadelphia, Pa.
Nicholson File Co., Providence, R. I.
- Filters. (Water, for Domestic and Industrial Purposes.)**
American Water Softener Co., Philadelphia, Pa.
International Filter Co., Chicago, Ill.
Lynn-Superior Co., The, Cincinnati, O.
New York Con. Jewell Fil. Co., New York, N. Y.
Roberts Filter Mfg. Co., Philadelphia, Pa.
Seale & Sons Co., Wm. B., Pittsburgh, Pa.
Tucker & Laxton, Charlotte, N. C.
- Financial Publication.**
Financial Review, New York, N. Y.
- Fire Alarm Boxes.**
Balto. Mch. Products Co. (Relay Station P. O.), Baltimore, Md.
- Fire Clay Brick.** [See Brick, Fire Clay.]
- Fire Box Bricks.**
Ashland Fire Brick Co., Ashland, Ky.
- Fire Door Fixtures.**
Victor Mfg. Co., Newburyport, Mass.
- Fire Extinguishers.**
Badger & Sons Co., E. B., Boston, Mass.
General Fire Extinguisher Co., Providence, R. I.
Kaiser, Louis E., Baltimore, Md.
- Fire Extinguishing Apparatus.**
General Fire Extinguisher Co., Providence, R. I.
- Fire Escapes.**
Bolles Iron & Wire Works, J. E., Detroit, Mich.
Chesapeake Iron Works, Baltimore, Md.
- Fire Insurance.**
Hartford Fire Insurance Co., Hartford, Conn.
- Fireplaces. (Artistic Brick.)**
Flake & Co., Inc., New York, N. Y.
- Fireproof Building Construction. (Steel.)** [See Concrete Construction.]
- Fireproof Building Material.**
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Johns-Manville Co., H. W., New York, N. Y.
- Fireproof Doors and Shutters.**
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Klineear Mfg. Co., Columbus, O.
New Orleans Root & J. Co., New Orleans, La.
Richmond Safety Gate Co., Richmond, Ind.
United States Metal Products Co., New York, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Fireproof Windows. (See Window Frames and Sashes (Fireproof).)**
- Flanges. (Iron and Steel.)**
American Cast Iron Pipe Co., Birmingham, Ala.
American Pipe & Construction Co., Phila., Pa.
American Spiral Pipe Works, Chicago, Ill.
Cameron Steam Pump Wks., A. S., New York, N. Y.
Dart Manufacturing Co., E. M., Providence, R. I.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
McWane Pipe Works, Lynchburg, Va.
National Tube Co., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Fdy. Co., New York, N. Y.
Whitlock Coil Pipe Co., Hartford, Conn.
Wood & Co., R. D., Philadelphia, Pa.
- Flexible Joints.**
Moran Flex. Steam Joint Co., Inc., Louisville, Ky.
- Flooring. (Cement.)**
Dagostin & Angelini Bros., Montgomery, Ala.
- Flooring. (Hardwood, Maple, Oak.)**
Carroll Portland Cement Co., Charleston, S. C.
Northcross Mantel Co., W. J., Memphis, Tenn.
Nashville Hardw'd Floor Co., Nashville, Tenn.
- Flour and Grist Mill Machinery and Supplies.**
Caldwell & Sons Co., H. W., Chicago, Ill.
Gibbs Machinery Co., Columbia, S. C.
Nordyke & Marmor Co., Indianapolis, Ind.
Salem Foundry & Machine Works, Salem, Va.
Starr Co., B. F., Baltimore, Md.
Veatch & Co., L. R., Louisville, Ky.
Wolf Co., Chambersburg, Pa.
- Flushtank Regulator.**
Modern Iron Works, Quincy, Ill.
- Foot Valves.**
Cameron Steam Pump Wks., A. S., New York, N. Y.
- Forges.**
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Hyde Park, Mass.
- Forgings.**
Richmond Forgings Corporation, Richmond, Va.
Weimer Chain & Iron Co., Lebanon, Pa.
- Forgings. (Hammered.)**
Erie Forge Co., Erie, Pa.
- Foundations. (Waterproof.)**
Underground Constr. Co., The, St. Louis, Mo.
- Foundations. (Open or Pneumatic.)**
Missouri Val. Bdge. & Iron Co., Leavenworth, Kan.
- Foundry Equipment and Supplies.**
Paxon Co., J. W., Philadelphia, Pa.
- Frogs. [See Railroad Frogs and Switches.]**
- Fuel Economizer.**
Green Fuel Economizer Co., Mattewan, N. Y.
Sturtevant Co., B. F., Hyde Park, Mass.
- Fuel Oil.**
Gulf Refining Co., Pittsburgh, Pa.
Texas Co., The, New York, N. Y.
- Fuel Oil Equipment.**
Petroleum Iron Works Co., Sharon, Pa.
- Fuses, Bases and Fittings.**
Johns-Manville Co., H. W., New York, N. Y.
- Galvanized Steel and Iron.**
American Sheet & Tin Plate Co., Pittsburgh, Pa.
J. C. H. Galvanizing Co., Philadelphia, Pa.
La Belle Iron Works, Steubenville, O.
McCalla, Harold, Philadelphia, Pa.
New Orleans Roof & Metal Co., New Orleans, La.
Wood Iron & Steel Co., Alan, Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.
- Galvanizing Machinery.**
Wilfong Iron Works Co., Millard F., Philadel-phia, Pa.
- Garages. (Fireproof and Portable.)**
Harry Steel Co., O. K., St. Louis, Mo.
- Gas Blowers. (Turbine.)**
Terry Steam Turbine Co., New York, N. Y.
- Gas Compressors.**
Blaisdell Machinery Co., Bradford, Pa.
Ingersoll-Rand Co., New York, N. Y.
- Gas Engines. [See Engines, Gas.]**
- Gas Holders.**
Chicago Bridge & Iron Wks., Chicago, Ill.
- Gas Plants.**
Western Gas Construction Co., Ft. Wayne, Ind.
- Gas Producers.**
Bogart Gas Power Eng. Co., Buffalo, N. Y.
Otto Gas Engine Works, Philadelphia, Pa.
Standard Gas Power Co., Atlanta, Ga.
Westinghouse Machine Co., Pittsburgh, Pa.
Wood & Co., R. D., Philadelphia, Pa.
- Gasoline and Kerosene.**
Gulf Refining Co., Pittsburgh, Pa.
Texas Co., The, New York, N. Y.
- Gas and Steam Fitters' Tools.**
Saunders' Sons, D., Yorkers, N. Y.
- Gaskets. (Rubber.)**
N. J. Car Spring & Rubber Co., Jersey City, N. J.
- Gears.**
Albro-Glen Elevator Co., Philadelphia, Pa.
Brown Co., A. & F., New York, N. Y.
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son Co., H. W., Chicago, Ill.
Cresson Co., Geo. V., Philadelphia, Pa.
Dayton Globe Iron Works Co., Dayton, O.
Dodge Manufacturing Co., Mishawaka, Ind.
Earle Gear & Machine Co., The, Philadelphia, Pa.
Jeffrey Mfg. Co., Columbus, O.
Poole Engineering & Machine Co., Baltimore, Md.
Positive Clutch & Pulley Works, Buffalo, N. Y.
Trump Mfg. Co., Springfield, O.
- Geologists.**
Bureau of Assoc. Geological Engineers, Boston, Mass.
Froehling & Robertson, Richmond, Va.
- Glass. (Plate, etc.)**
Binswanger & Co., Memphis, Tenn.
Holophane Co., Newark, O.
- Governors.**
Pickering Governor Co., Portland, Conn.
- Grain Elevator Supplies.**
Caldwell & Sons Co., H. W., Chicago, Ill.
Dodge Manufacturing Co., Mishawaka, Ind.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Nicetown (Philadelphia), Pa.
- Graphite.**
Dixon Crucible Co., Joseph, Jersey City, N. J.
- Grates and Grate Bars.**
Mellor Furnace Engineering Co., Philadelphia, Pa.
Thomas Grate Bar Co., Birmingham, Ala.
- Gravel.**
Arundel Sand & Gravel Co., Baltimore, Md.
Lathrop & Co., C. F., Richmond, Va.
- Grease.**
Albany Lubricating Co., New York, N. Y.
- Grease Cups.**
Albany Lubricating Co., New York, N. Y.
- Greases and Lubricating Compounds.**
Albany Lubricating Co., New York, N. Y.
Galena Signal Oil Co., Franklin, Pa.
Robinson & Son Co., Wm. C., Baltimore, Md.
Texas Co., The, New York, N. Y.
- Grinders. (Gypsum, Limestone, etc.)**
Gardner Crusher Co., New York, N. Y.
Williams Pat. Crusher & Pulv. Co., Chicago, Ill.
- Grinding Wheels.**
Abrasive Material Co., Philadelphia, Pa.
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass.
Vitrified Wheel Co., Westfield, Mass.
- Groovers.**
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
- Gunpowder.**
du Pont de Nemours Powder Co., E. I., Wilming-ton, Del.
- Hammers. (Steam, Power, Pneumatic.)**
Chicago Pneumatic Tool Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
- Hand Elevators.**
McKenna Bros. Brass Co., Pittsburgh, Pa.
Sidney Elevator Mfg. Co., Sidney, O.
- Handle Machinery. [See Woodworking Machy.]**
- Hangers. [See Pulleys, Shafting and Hangers.]**
- Hardwood Doors and Trim.**
Massee & Felton Lumber Co., Macon, Ga.
- Hauling Engines. (Steam Traction.)**
Case Threshing Mach. Co., J. I., Racine, Wis.
- Hay Tools.**
Myers & Bro., F. E., Ashland, O.
- Heater. (Portable, for Bituminous Pavements.)**
Ruggles-Coles Engineering Co., New York, N. Y.
- Heating Apparatus, Engineers and Contractors.**
American Blower Co., Detroit, Mich.
American Hoist & Derrick Co., St. Paul, Minn.
Brown Holsting Mch. Co., Cleveland, O.
Byers Machine Co., John F., Ravenss, O.
Clyde Iron Works, Duluth, Minn.
Contractors' Plant Mfg. Co., Ltd., Buffalo, N. Y.
Exeter Machine Works, Pittston, Pa.
Flory Mfg. Co., S., Bangor, Pa.
Hayward Co., New York, N. Y.
Link-Belt Co., Nicetown (Philadelphia), Pa.
Lidgerwood Mfg. Co., New York, N. Y.
Males Co., Cincinnati, O.
Mead-Morrison Mfg. Co., Cambridgeport, Mass.
Monaghan Machine Co., Chicago, Ill.
National Hoisting Engine Co., Harrison, N. J.
Novo Engine Co., Lansing, Mich.
Smith Co., T. L., Atlanta, Ga.
Stroudsburg Engine Works, Stroudsburg, Pa.
- Hoists.**
CHAIN.
Ford Chain Block & Mfg. Co., Philadelphia, Pa.
Speidel, J. G., Reading, Pa.
- ELECTRIC.**
American Hoist & Derrick Co., St. Paul, Minn.
Lidgerwood Mfg. Co., New York, N. Y.
Monaghan Mch. Co., Chicago, Ill.
Northern Engineering Works, Detroit, Mich.
Patten Mfg. Co., Chattanooga, Tenn.
- PNEUMATIC MOTORS.**
Chicago Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
- Hoops, Bands, etc. (Galvanized.)**
J. C. H. Galvanizing Co., Philadelphia, Pa.
McCalla, Harold, Philadelphia, Pa.
- Hoops. (Barrel.)**
American Steel & Wire Co., Chicago, Ill.
Carnegie Steel Co., Pittsburgh, Pa.
- Hose.**
Eureka Fire Hose Mfg. Co., New York, N. Y.
N. J. Car Spring & Rubber Co., Jersey City, N. J.
- Hotels.**
Emerson Hotel, Baltimore, Md.
Great Southern Hotel, Gulfport, Miss.
Hotel Essex, Boston, Mass.
- Hot Water Service Heaters.**
Alberger Pump Co., New York, N. Y.
- Hydrants.**
Bourbon Copper & Brass Wks. Co., Cincinnati, O.
Columbian Iron Works, Chattanooga, Tenn.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Goulds Mfg. Co., Seneca Falls, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Myers & Bros., F. E., Ashland, O.
Wood & Co., R. D., Philadelphia, Pa.
- Hydraulic Giants.**
American Spiral Pipe Works, Chicago, Ill.
- Hydraulic Rams.**
Goulds Mfg. Co., Seneca Falls, N. Y.
Rife Engine Co., New York, N. Y.
- Hydrogen.**
International Oxygen Co., New York, N. Y.
- Icemaking Machinery and Supplies.**
Columbus Iron Works Co., Columbus, Ga.
Creamery Package Mfg. Co., De Kalb, Ill.
Frick Co., The, Waynesboro, Pa.
Hague, John, St. Louis, Mo.
Hemington Machine Co., Wilmington, Del.
Heumliel-Dawley Mfg. Co., St. Louis, Mo.
Taft-Nordmeyer Eng. Co., St. Louis, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vort Machine Co., Henry, Louisville, Ky.
York Mfg. Co., York, Pa.
- Incorporators. (Companies.)**
Delaware Trust Co., Wilmington, Del.
Sieber & Co., H. F., Philadelphia, Pa.
- Industrial, Agricultural and Commercial Opportunities.**
- CITIES AND TOWNS.**
Atlanta, Ga., Ga. Bureau of Indus'ty & Immig'r.
Baltimore, Md., Gas & Electric Co.
Bedford City, Va., Board of Trade.
Fayetteville, N. C., Chamber of Commerce.
Newport News, Va., Old Dominion Land Co.
Texas City, Tex., Texas City Transportation Co.
Winchester, Va., Business Men's League.
- RAILROADS.**
Atlanta, Birm'g'm & Atlantic R. R., Atlanta, Ga.
Atlanta & W. Point R. R. Co., Montgomery, Ala.
Baltimore & Ohio Railroad, Baltimore, Md.
Carolina, Clinchfield & O. Ry., Johnson City, Tenn.
Central of Georgia Ry. Co., Savannah, Ga.
Florida East Coast Ry., St. Augustine, Fla.
Illinois Central Railroad Co., Chicago, Ill.
Norfolk & Western Railway, Roanoke, Va.
Richmond, Fredericksburg & Potomac Railroad, Ashland, Va.
Seaboard Air Line, Portsmouth, Va.
Southern Railway Co., Washington, D. C.
Tennessee Central Railroad Co., Cookeville, Tenn.
Virginia Railway & Power Co., Richmond, Va.
- Industrial Track Work. [See Railways Ind.]**
- Injectors.**
Jenkins Bros., New York, N. Y.
Sellers & Co., Inc., Wm., Philadelphia, Pa.
- Insulating Materials.**
Johns-Manville Co., H. W., New York, N. Y.
- Insurance.**
Hartford Fire Insurance Co., Hartford, Conn.
Hartford Steam Boiler Inspection & Ins. Co., Hartford, Conn.
Maryland Casualty Co., Baltimore, Md.
- Interior Trim. (Metallic.)**
Dahlstrom Metallic Door Co., Jamestown, N. Y.
U. S. Metal Products Co., New York, N. Y.
- Interstate Commerce Practice.**
Van Sant, Frank, Washington, D. C.
- Iron.**
Alabama Con. Coal & Iron Co., Birmingham, Ala.
American Rolling Mill Co., Middletown, O.
La Belle Iron Works, Steubenville, O.
Milton Mfg. Co., Milton, Pa.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Republie Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Br'g'm'm, Ala.
Wood Iron & Steel Co., Alan, Philadelphia, Pa.
- Irrigation Machinery.**
Blakeslee Mfg. Co., Du Quoin, Ill.
Cameron Steam Pump Wks., A. S., New York, N. Y.
- Journals. (Financial.)**
Financial Review, New York, N. Y.

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New York, N. Y.

Kettles. (Drossing, Tinning, Smelting.)
Wittfog Iron Works Co., Millard F., Philadelphia, Pa.
Kettles. (Steam Jacket.)
Roder & Sons Co., E. B., Boston, Mass.
Petroleum Iron Works Co., Sharon, Pa.
Key Seater. (Portable.)
Bar & Son, John T., Brooklyn, N. Y.
Knitting Machinery.
Acme Knitting Machine & Needle Co., Franklin Falls, N. H.
Lacquers. (All Purposes.)
Durlaque Mfg. Co., St. Louis, Mo.
Lamp Posts. (Electric, Gas.)
Western Gas Construction Co., Ft. Wayne, Ind.
Lamps. (Are and Incandescent.)
Boston Incandescent Lamp Co., Danvers, Mass.
Columbia Incandescent Lamp Co., St. Louis, Mo.
Fosteria Incandescent Lamp Co., Fosteria, O.
General Electric Co., Schenectady, N. Y.
Kentucky Electrical Co., Owensboro, Ky.
Lee Electric Co., Baltimore, Md.
Piedmont Electric Co., Asheville, N. C.
Western Electric Co., New York, N. Y.
Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.
Lands.
Barr, J. H. C., Philadelphia, Pa.
Ferdig & Co., Albert, Brunswick, Ga.
Kimbrough & Co., J. T., Atlanta, Ga.
Nashua & Co., S. L., Norfolk, Va.
Sperry & Co., Marcus E., Tampa, Fla.
Lath. (Expanded Metal.)
Cardina Portland Cement Co., Charleston, S. C.
Milwaukee Corrugating Co., Milwaukee, Wis.
Lathes. (Engine.)
Greaves, Kinsman & Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., New York, N. Y.
Lawn Furniture.
Bulles Iron & Wire Works, J. E., Detroit, Mich.
Dufur & Co., Baltimore, Md.
Dufur, Baggett & Co., Baltimore, Md.
Leadite.
Leadite Co., The, Philadelphia, Pa.
Lighting Equipment.
Hilphane Co., Newark, O.
Lime.
Cardina Portland Cement Co., Charleston, S. C.
Security Cement & Lime Co., Baltimore, Md.
Southern Portland Cement Co., Charleston, S. C.
Tidewater Portland Cement Co., Baltimore, Md.
Lime. (Hydrated.)
Security Cement & Lime Co., Baltimore, Md.
Tidewater Portland Cement Co., Baltimore, Md.
Limestone Products.
Security Cement & Lime Co., Baltimore, Md.
Liquor Filters.
International Filter Co., Chicago, Ill.
Lithographers, Engravers.
Young & Selden Co., Baltimore, Md.
Loans.
Assets Realization Co., Chicago, Ill.
Lockers. (Metal.)
Kegley Metal Ceiling Mfg. Co., S. Pittsb'gh, Pa.
Locomotives.
INDUSTRIAL.
American Locomotive Co., New York, N. Y.
Balwin Locomotive Works, The, Philadelphia, Pa.
Dye Machine Co., John P., Ravenna, O.
Climax Mfg. Co., Corry, Pa.
Davenport Locomotive Works, Davenport, Ia.
Helsler Locomotive Works, Erie, Pa.
Jeffrey Mfg. Co., Columbus, O.
Lima Locomotive & Machine Co., Lima, O.
Males Co., Cincinnati, O.
Pater Co., H. K., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
RAILWAY.
American Locomotive Co., New York, N. Y.
Balwin Locomotive Works, The, Philadelphia, Pa.
Lima Locomotive & Machine Co., Lima, O.
Males Co., Cincinnati, O.
Southern Supply Co., Norfolk, Va.
Looms and Weaving Machinery.
Draper Co., Hopedale, Mass.
Mann Machine Works, Taunton, Mass.
Lubricants.
Albany Lubricating Co., New York, N. Y.
Lumber.
Industrial Lumber Co., Elizabeth, La.
Massee & Felton Lumber Co., Macon, Ga.
Lumber. (Heavy Construction, Pitch Pine, etc.)
Massee & Felton Lumber Co., Macon, Ga.
National Lumber & Creosote Co., Texarkana, Ark.
Naylor & Co., S. E., Gulfport, Miss.
Lumber. (Yellow Pine.)
Industrial Lumber Co., Elizabeth, La.
Lumber Buggies.
Sole Steam Feed Works, Meridian, Miss.
Lumber Stackers.
Sole Steam Feed Works, Meridian, Miss.
Machinery. (Special.)
Bliss Co., E. W., Brooklyn, N. Y.
Elme, Lewis T., Alpena, Mich.
Lester & Co., Charles, Brooklyn, N. Y.
Oil City Boiler Co., Oil City, Pa.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Ryersford Fdry. & Mch. Wks., Ryersford, Pa.
Stratton & Bragg Co., Petersburg, Va.
Universal Telegraphic Co., Baltimore, Md.
Machinery and Supplies. (New and Second-Hand Bargains.)
Boston Iron & Metal Co., Baltimore, Md.
Chicago House Wrecking Co., Chicago, Ill.
Cleveland Belting & Machinery Co., Cleveland, O.
Donner Railway Equipment Co., Chicago, Ill.
Hosuta & Son, New York, N. Y.
Hosuta's Sons Co., Henry A., Philadelphia, Pa.
Hyde Bros. & Co., New York, N. Y.
Lehmann, H., Pittsburgh, Pa.
Lehman, Charles T., Birmingham, Ala.
Lewne & Co., E., Philadelphia, Pa.
Linton, W. J., New York, N. Y.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
Marine Metal & Supply Co., New York, N. Y.
Maths Iron & Metal Co., G., St. Louis, Mo.
Hammeller Engineering Co., Chicago, Ill.
Peters & Contractors' Supply Co., New York, N. Y.
Pittsburgh Mch. & Equip. Co., Pittsburgh, Pa.
Preston Tool & Supply Co., New York, N. Y.
Sawle Machinery Co., Cincinnati, O.
Sawel, Frank, Philadelphia, Pa.
Seiffert's Sons, Inc., L. F., Philadelphia, Pa.
Southern Supply Co., Norfolk, Va.
Tampa Machinery Exchange, Tampa, Fla.
Texas Supply Co., Beaumont, Tex.
Tomney, Frank, Philadelphia, Pa.
Winters Co., Herman L., Philadelphia, Pa.
Yamaley, Thomas, Philadelphia, Pa.

Machine Tools.
Greaves, Kinsman & Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., New York, N. Y.
Machinists. (Engineers.)
American Mch. & Mfg. Co., Charlotte, N. C.
Roanoke Iron Works, Inc., Roanoke, Va.
Stratton & Bragg Co., Petersburg, Va.
Universal Telegraphic Co., Baltimore, Md.
Magnesia Materials.
Johns-Manville Co., H. W., New York, N. Y.
Magnesite. (Dead Burned.)
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Magnet Electro. (For Cottonseed, Linters and Hullers.)
Dixie Electro Magnet Co., Memphis, Tenn.
Magnetic Separators.
Paxson Co., J. W., Philadelphia, Pa.
Mail Chutes.
Cutler Mail Chute Co., Rochester, N. Y.
Mantels. (Wooden.)
Northcross Mantel Co., W. J., Memphis, Tenn.
Marble Work. (Interior.)
Dagostin & Angelini Bros., Montgomery, Ala.
Southern Mosaic Tile Co., Birmingham, Ala.
Masonry Dams.
Multiple Arch Hydraulic Const. Co., Ltd., Spar-tanburg, S. C.
Mechanical Draft.
American Blower Co., Detroit, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Richmond Engr. & Mfg. Co., Richmond, Va.
Sturtevant Co., B. F., Hyde Park, Mass.
Metal Ceilings. (See Ceilings, Metal.)
Metaline.
North Amer. Metaline Co., Long Island City, N. Y.
Metal Culverts. (See Culverts.) (Corrugated Metal.)
Metal Polish.
Hoffman, Geo. W., Indianapolis, Ind.
Metal Shingles.
Burris & Co., John T., Anderson, S. C.
Chattanooga Rfg. & Fdry. Co., Chattanooga, Tenn.
Cincinnati Sheet Metal & Rfg. Co., Cincinnati, O.
Courtright Metal Roofing Co., Philadelphia, Pa.
Edwards Manufacturing Co., Cincinnati, O.
Hyndman Roofing Co., Cincinnati, O.
Metal Window Frames and Sashes.
Detroit Steel Products Co., Detroit, Mich.
Edwards & Co., The, Cincinnati, O.
Kegley Metal Cell. & Mfg. Co., S. Pittsb'gh, Pa.
United States Metal Products Co., New York, N. Y.
Voigtman & Co., Chicago, Ill.
Metal Work. (Stamped and Embossed Hotel Checks, Key Tags, etc.)
American Railway Supply Co., New York, N. Y.
Metal-Working Machinery.
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
Gibbs Machinery Co., Columbus, S. C.
Lester & Co., Charles, Brooklyn, N. Y.
Price Machinery Co., S. M., Norfolk, Va.
Ryersford Fdry. & Mch. Co., Ryersford, Pa.
Micrometers, Calipers, etc.
Starrett Co., L. S., Athol, Mass.
Milk Filters. (Liquor, Milk, etc.)
International Filter Co., Chicago, Ill.
Mill Engineers and Architects.
Lockwood, Greene & Co., Boston, Mass.
Slinne, J. E., Greenville, S. C.
Mill Supplies.
Appomattox Iron Wks. & Sup. Co., Petersburg, Va.
Bailey-Lebby Co., Charleston, S. C.
Cameron & Barkley Co., Charleston, S. C.
Gainesville Iron Works, Gainesville, Ga.
Greenwald Co., I. & E., Cincinnati, O.
Lindsay, J. L., Inc., Richmond, Va.
Lombard Iron Works, Augusta, Ga.
Manning, Maxwell & Moore, Inc., New York, N. Y.
Mecklenburg Iron Works, Charlotte, N. C.
Nurdyke & Marmon Co., Indianapolis, Ind.
Salem Foundry & Machine Works, Salem, Va.
Smith-Courtney Co., Richmond, Va.
Starr Co., B. F., Baltimore, Md.
Stratton & Bragg Co., Petersburg, Va.
Ward-Becke Co., Washington, D. C.
Wolf Co., Chambersburg, Pa.
Mineral. (Industrial.)
Howard & Co., Savannah, Ga.
Mining Machinery. (Gold, Copper, Plate, etc.)
Bartlett & Snow Co., C. O., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Mecklenburg Iron Works, Charlotte, N. C.
Power & Mining Machinery Co., Cudahy, Wis.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Mixer Machinery.
Smith Co., T. L., Atlanta, Ga.
Mixing Machinery.
Dunning, W. D., Syracuse, N. Y.
Lynn-Superior Co., The, Cincinnati, O.
Mortar Colors.
Chattanooga Paint Co., Chattanooga, Tenn.
Motor Trucks.
International Motor Co., New York, N. Y.
Mouldings, Casings, etc.
Massee & Felton Lumber Co., Macon, Ga.
Nails and Spikes.
American Steel & Wire Co., Chicago, Ill.
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.
Nitre Pots, Eggs.
Pratt Engineering & Mach. Co., Atlanta, Ga.
Nuts. (See Bolts, Nuts, Rivets, etc.)
Office Furniture.
Rue & Thompson, Baltimore, Md.
Oils. (Lubricating, etc.)
Albany Lubricating Co., New York, N. Y.
Borne-Seymour Co., New York, N. Y.
Galena Signs Oil Co., Franklin, Pa.
Gulf Refining Co., Pittsburgh, Pa.
Robinson & Son Co., Wm. C., Baltimore, Md.
Texas Co., The, New York, N. Y.
Oil-Burning Appliances.
Petroleum Iron Works Co., Sharon, Pa.
Oil Cans.
Wall Mfg. Supply Co., P., Allegheny, Pa.

Oil Engines. (See Engines (Oil).)
Oil Separators.
Stewart Heater Co., Buffalo, N. Y.
Oil Stones.
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass.
Oil-Well Machinery.
Keystone Steam Well Mach. Co., Beaver Falls, Pa.
Williams Bros., Ithaca, N. Y.
Ore Briquetting Machinery.
Devillers, Robert, Brooklyn, N. Y.
Ornamental Iron Work.
Belmont Iron Works, Inc., Philadelphia, Pa.
Bolles Iron & Wire Works, J. E., Detroit, Mich.
Chattanooga Iron & Wire Wks., Chattanooga, Tenn.
Chesapeake Iron Works, Baltimore, Md.
Dow Wire Works Co., Louisville, Ky.
Clio Elevator & Machine Co., The, Columbus, O.
Roanoke Iron Works, Inc., Roanoke, Va.
Schreiber & Sons Co., The, Cincinnati, O.
Snead Architectural Iron Works, Louisville, Ky.
Southern Wire & Iron Mfg. Co., Dallas, Tex.
Oxy-Acetylene Welding and Cutting Outfit and Supplies.
International Oxygen Co., New York, N. Y.
Oxygen.
International Oxygen Co., New York, N. Y.
Packing. (Asbestos, Metallic, Rubber, Leather, etc.)
American Huhn Packing Co., New York, N. Y.
Jenkins Bros., New York, N. Y.
Johns-Manville Co., H. W., New York, N. Y.
N. J. Car Spring & Rubber Co., Jersey City, N. J.
Power Specialty Co., New York, N. Y.
Paint. (Bridge.)
Dixon Crucible Co., Jos., Jersey City, N. J.
National Roofing Co., Tonawanda, N. Y.
Paint. (Cold Water.)
Wilhelm Co., A., New York, N. Y.
Paint. (Metal Preservative.)
National Roofing Co., Tonawanda, N. Y.
Wilhelm Co., A., New York, N. Y.
Paint. (Roofing, Building, etc.)
Armistage Mfg. Co., The, Richmond, Va.
Cameron & Barkley Co., Charleston, S. C.
Carolina Portland Cement Co., Charleston, S. C.
Chattanooga Paint Co., Chattanooga, Tenn.
Dixon Crucible Co., Jos., Jersey City, N. J.
Gidden Varnish Co., Cleveland, O.
National Roofing Co., Tonawanda, N. Y.
Standard Paint Co., New York, N. Y.
Wilhelm Co., A., New York, N. Y.
Painting. (Contractors for Bridges, Buildings, etc.)
Dinaeo & Bro., A., Pittsburgh, Pa.
Paint-Making Machinery.
Campbell, P. F., Philadelphia, Pa.
Lynn Superior Co., The, Cincinnati, O.
Paper. (Roofing, Building, Sheeting, etc.)
Armistage Mfg. Co., Richmond, Va.
Barrett Mfg. Co., Philadelphia, Pa.
Cameron & Barkley Co., Charleston, S. C.
Southeastern Lime & Cement Co., Charleston, S. C.
Standard Roofing Co., Tulsa, Okla.
Passenger Coach Steps. (Extension.)
Blake Car Step Works, Charlotte, N. C.
Patent Attorneys.
Brown, Eugene C., Washington, D. C.
Chandler & Co., H. Ellis, Washington, D. C.
Chandler & Chandler, Washington, D. C.
Evans & Co., Victor J., Washington, D. C.
Jones, Bennett S., Washington, D. C.
Owen, Richard B., Washington, D. C.
Patterns.
Roanoke Iron Works, Inc., Roanoke, Va.
Pavement Filler.
Barrett Mfg. Co., Philadelphia, Pa.
Paving. (Contractors for Creosoted Wood Block.)
Creosoted Wood Block Pav. Co., New Orleans, La.
Paving Blocks. (Wood Creosote-Resinate.)
Gulfport Creosoting Co., Gulfport, Miss.
Southern Wood Preserving Co., Atlanta, Ga.
U. S. Wood Preserving Co., New York, N. Y.
Paving Brick.
Carlyle Paving Brick Co., Portsmouth, O.
Copeland-Ingalls Shale Brick Co., Birmingham, Ala.
Paving Machines. (Bituminous Materials.)
Smith Co., T. L., Atlanta, Ga.
Perforated Metal.
Caldwell & Son, H. W., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
Erdle Perforating Co., Rochester, N. Y.
Heudrick Mfg. Co., The, Carbondale, Pa.
Mundt & Sons, Charles, Jersey City, N. J.
Perspectives. (Water Color, for Architects.)
Alger & Smith, Atlanta, Ga.
Petroleum Refiners.
Gulf Refining Co., Pittsburgh, Pa.
Standard Oil Co., Cincinnati, O.
Phosphate Machinery.
Aising Engineering Co., J. R., New York, N. Y.
American Process Co., New York, N. Y.
Bailey-Lebby Co., The, Charleston, S. C.
Cameron & Barkley Co., Charleston, S. C.
Link-Belt Co., Nicetown (Philadelphia), Pa.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Pratt Engineering & Mach. Co., Atlanta, Ga.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Valk & Murdock Iron Works, Charleston, S. C.
Walker & Elliott, Wilmington, Del.
Phosphor-Bronze. (Wire Rods, Sheets.)
Phosphor-Bronze Smelting Co., Philadelphia, Pa.
Photo-Engravers.
Baltimore-Maryland Engr. Co., Baltimore, Md.
Pig Iron.
Alabama Coal & Iron Co., Birmingham, Ala.
La Belle Iron Works, Steubenville, O.
Republic Iron & Steel Co., Youngstown, O.
Rogers, Brown & Co., Cincinnati, O.
Tennessee Coal, Iron & R. R. Co., B'm'gh'm, Ala.
Pile Drivers.
Rucyrus Co., Milwaukee, Wis.
Vulcan Iron Works, Chicago, Ill.
Piling. (Creosoted.)
Gulfport Creosoting Co., Gulfport, Miss.
Intern'l Creosoting & Const. Co., Galveston, Tex.
Southern Creosoting Co., Ltd., Sidel, La.

Pillow Blocks.
Caldwell Co., Inc., W. E., Louisville, Ky.
Dodge Manufacturing Co., Mishawaka, Ind.
Golden's Foundry & Machine Co., Columbus, Ga.
Pine Tar.
Atlantic Turpentine & Refin'g Co., Savannah, Ga.
Pipe. (Cast Iron.)
American Cast Iron Pipe Co., Birmingham, Ala.
American Pipe & Construction Co., Phila., Pa.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
McWane Pipe Works, Lynchburg, Va.
U. S. Cast Iron Pipe & Fdy. Co., New York, N. Y.
Wood & Co., R. D., Philadelphia, Pa.
Pipe. (Coll.)
Columbus Iron Works Co., Columbus, Ga.
Frick Co., The, Wyncboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Whitlock Coll Pipe Co., Hartford, Conn.
York Mfg. Co., York, Pa.
Pipe. (Corrugated Culvert.)
American Rolling Mill Co., Middletown, O.
Canton Culvert Co., The, Canton, O.
Dixie Culvert & Metal Co., Atlanta, Ga.
Gallon Iron Works Co., Gallon, O.
Harry Steel Co., O. K., St. Louis, Mo.
Kentucky Culvert Mfg. Co., Buacel, Ky.
North Carolina Metal Culv. Co., Greensboro, N. C.
Virginia Metal Culvert Co., Roanoke, Va.
Virginia Railway Supply Co., Norfolk, Va.
Pipe. (Riveted.)
Abendroth & Root Mfg. Co., Newburgh, N. Y.
Keeler Co., E., Williamsport, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Ruemml-Dawley Mfg. Co., St. Louis, Mo.
Pipe. (Spiral Riveted.)
Abendroth & Root Mfg. Co., Newburgh, N. Y.
American Spiral Pipe Works, Chicago, Ill.
Pipe. (Wood.)
Wyckoff & Son Co., A., Elmira, N. Y.
Pipe. (Wrought.)
La Belle Iron Works, Steubenville, O.
National Tube Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.
Pipe Bends.
Columbus Iron Works Co., Columbus, Ga.
Whitlock Coll Pipe Co., Hartford, Conn.
Pipe Covering. (Steam.)
Johns-Manville Co., H. W., New York, N. Y.
Southern Pipe Covering Co., Inc., Richmond, Va.
Wyckoff & Son Co., A., Elmira, N. Y.
Pipe Cutting and Threading Machinery.
Saunders' Sons, D., Yonkers, N. Y.
Pipe Fittings.
American Cast Iron Pipe Co., Birmingham, Ala.
Columbus Iron Works Co., Columbus, Ga.
York Mfg. Co., York, Pa.
Pipe Jointing. (Gas and Water Main.)
Leadite Co., The, Philadelphia, Pa.
Pipe Locator.
Modern Iron Works, Quincy, Ill.
Pipe Unions and Joints.
Dart Mfg. Co., E. M., Providence, R. I.
National Tube Co., Pittsburgh, Pa.
Whitlock Coll Pipe Co., Hartford, Conn.
Pipe Wrenches and Cutters.
Saunders' Sons, D., Yonkers, N. Y.
Pitch.
Barrett Mfg. Co., Philadelphia, Pa.
Planers. (Metal.)
Manning, Maxwell & Moore, Inc., New York, N. Y.
Planing Mill Work.
Massee & Felton Lumber Co., Macon, Ga.
Plaster of Paris.
King & Co., J. B., New York, N. Y.
Plaster.
Security Cement & Lime Co., Baltimore, Md.
Plaster. (Asbestos Cement, Plaster of Paris.)
King & Co., J. B., New York, N. Y.
Plaster Boards.
Hercules Plaster Board Co., Hampton, Va.
King & Co., J. B., New York, N. Y.
Plaster Machinery.
Bartlett & Snow Co., C. O., Cleveland, O.
Plates.
Cincinnati Iron & Steel Co., Cincinnati, O.
Wood Iron & Steel Co., Alan, Philadelphia, Pa.
Plugs. (Wall.)
Wicks Mfg. Co., Milton, O., Glen Cove, N. Y.
Pneumatic Tools. (See Tools—Pneumatic.)
Polishing Machinery. (Wheels and Blocks.)
Abeville Material Co., Philadelphia, Pa.
Carborundum Co., Niagara Falls, N. Y.
Vitrified Wheel Co., Westfield, Mass.
Power Transmission Machinery.
Bailey-Lebby Co., Charleston, S. C.
Brown Co., A. & F., New York, N. Y.
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son Co., J. S., Chicago, Ill.
Cresson Co., Geo. V., Philadelphia, Pa.
Dayton Globe Iron Works Co., Dayton, O.
Dodge Manufacturing Co., Mishawaka, Ind.
Golden's Foundry & Machine Co., Columbus, O.
Greenwald Co., I. & E., Cincinnati, O.
Jeffrey Mfg. Co., Columbus, O.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lane Mfg. Co., Montpelier, Vt.
Lindsay, J. L., Inc., Richmond, Va.
Link-Belt Co., Nicetown (Philadelphia), Pa.
Morse Chain Co., Ithaca, N. Y.
Nurdyke & Marmon Co., Indianapolis, Ind.
Poole Engineering & Machine Co., Baltimore, Md.
Positive Clutch & Pulley Works, Buffalo, N. Y.
Price Machinery Co., S. M., Norfolk, Va.
Schofield's Sons Co., J. S., Macon, Ga.
Wolf Co., The, Chambersburg, Pa.
Wood's Sons Co., T. B., Chambersburg, Pa.
Presses. (Balling, Cottonseed Oil, etc., Hydraulic and Power.)
Boomer & Boschert Press Co., Syracuse, N. Y.
Cardwell Machine Co., Richmond, Va.
Continental Gp Co., Birmingham, Ala.
Gibbs Machinery Co., Columbus, S. C.
Presses. (Stamping.)
Bliss Co., E. W., Brooklyn, N. Y.
Lester & Co., Charles, Brooklyn, N. Y.
Preventive for Sap Stain.
Church & Dwight Co., New York, N. Y.
Printers. (Book, Catalog, Job, etc.)
Fleet-McGinley Co., Baltimore, Md.

- Promoters.**
Assets Realization Co., Chicago, Ill.
Electric Bond & Share Co., New York.
- Protector Steel.** (Concrete Curb, Steps, etc.)
Steel Protected Concrete Co., Philadelphia, Pa.
- Pulleys.** (Friction Clutch.)
Brown Co., A. & F., New York, N. Y.
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son Co., H. W., Chicago, Ill.
Crescon Co., Geo. V., Philadelphia, Pa.
Dodge Manufacturing Co., Mishawaka, Ind.
Dodge Engineering & Machine Co., Baltimore, Md.
Positive Clutch & Pulley Works, Buffalo, N. Y.
Sincclair-Scott Co., Baltimore, Md.
Wood's Sons Co., T. B., Chambersburg, Pa.
- STEEL SPLIT.**
American Pulley Co., Philadelphia, Pa.
Dodge Manufacturing Co., Mishawaka, Ind.
- WOOD SPLIT.**
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son Co., H. W., Chicago, Ill.
Dodge Manufacturing Co., Mishawaka, Ind.
Lane Mfg. Co., Montpelier, Vt.
Positive Clutch & Pulley Works, Buffalo, N. Y.
Saginaw Mfg. Co., Saginaw, Mich.
Salem Foundry & Machine Works, Salem, Va.
- Pulleys, Shafting and Hangers.**
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son Co., H. W., Chicago, Ill.
Crescon Co., Geo. V., Philadelphia, Pa.
Dodge Manufacturing Co., Mishawaka, Ind.
Green's Foundry & Machine Co., Columbus, Ga.
Greenwald Co., I. & E., Cincinnati, O.
Jeffrey Mfg. Co., Columbus, O.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lane Mfg. Co., Montpelier, Vt.
Link-Belt Co., Nictown (Philadelphia), Pa.
Nordyke & Macdon Co., Indianapolis, Ind.
Poole Engineering & Machine Co., Baltimore, Md.
Positive Clutch & Pulley Works, Buffalo, N. Y.
Standard Roller Bearing Co., Philadelphia, Pa.
Wood's Sons Co., T. B., Chambersburg, Pa.
- Pumps.** (Centrifugal.)
Alberger Pump Co., New York, N. Y.
Buffalo Steam Pump Co., Buffalo, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Erie Pump & Engine Works, Erie, Pa.
Goulds Mfg. Co., Seneca Falls, N. Y.
Haydon Pump Co., Quincy, Ill.
Morris Machine Works, Baldwinville, N. Y.
Nove Engine Co., Lansing, Mich.
Wood & Co., R. D., Philadelphia, Pa.
Worthington, H. R., New York, N. Y.
- Pumps.** (Deep Well.)
McGowan Co., John H., Cincinnati, O.
- Pumps.** (Hydraulic.)
Buffalo Steam Pump Co., Buffalo, N. Y.
Cardwell Machine Co., Richmond, Va.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Erie Pump & Engine Works, Erie, Pa.
Goulds Mfg. Co., Seneca Falls, N. Y.
Worthington, H. R., New York, N. Y.
- Pumps.** (Lift and Force.)
Goulds Mfg. Co., Seneca Falls, N. Y.
Ingersoll-Rand Co., New York, N. Y.
- Pumps.** (Odorous and Excavating.)
Goulds Mfg. Co., Seneca Falls, N. Y.
- Pumps.** (Pneumatic.)
Ingersoll-Rand Co., New York, N. Y.
- Pumps.** (Boiler Feed.)
Alberger Pump Co., New York, N. Y.
Cameron Steam Pump Wks., A. S., New York, N. Y.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
McGowan Co., John H., Cincinnati, O.
Moffatt Machinery Mfg. Co., Charlotte, N. C.
Murray Iron Works Co., Burlington, Ia.
Myers & Bros., F. E., Ashland, O.
Union Steam Pump Co., Battle Creek, Mich.
Worthington, H. R., New York, N. Y.
- Pumps.** (Rotary.)
Goulds Mfg. Co., Seneca Falls, N. Y.
- Pumps.** (Steam.)
Blakelee Mfg. Co., Du Quoin, Ill.
Buffalo Steam Pump Co., Buffalo, N. Y.
Cameron Steam Pump Wks., A. S., New York, N. Y.
Cameron & Barkley Co., Charleston, S. C.
Cook Well Co., The, St. Louis, Mo.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Deane Steam Pump Co., Holyoke, Mass.
Gardner Governor Co., Quincy, Ill.
Gibbs Machinery Co., Columbia, S. C.
Goulds Mfg. Co., Seneca Falls, N. Y.
Hooven, Owen, Rentschler Co., Hamilton, O.
Keystone Pump & Well Eng. Co., Beaver Falls, Pa.
McGowan Co., John H., Cincinnati, O.
Murray Iron Works Co., Burlington, Ia.
Price Machinery Co., S. M., Norfolk, Va.
Sydnor Pump & Well Co., Richmond, Va.
Union Steam Pump Co., Battle Creek, Mich.
Worthington, H. R., New York, N. Y.
- Pumps.** (Trench.)
Goulds Mfg. Co., Seneca Falls, N. Y.
- Pumps.** (Vacuum.)
Alberger Pump Co., New York, N. Y.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
Smith Co., F. L., Atlanta, Ga.
Union Steam Pump Co., Battle Creek, Mich.
- Pumps.** (Water-works.)
McGowan Co., John H., Cincinnati, O.
- Pumping Machinery.**
Allis-Chalmers Co., Milwaukee, Wis.
Blakelee Mfg. Co., Du Quoin, Ill.
Cameron Steam Pump Wks., A. S., New York, N. Y.
Cook Well Co., The, St. Louis, Mo.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Deane Steam Pump Co., Holyoke, Mass.
Deming Co., Salem, O.
Erie Pump & Engine Works, Erie, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Mfg. Co., Seneca Falls, N. Y.
Hooven, Owen, Rentschler Co., Hamilton, O.
Keystone Pump & Well Eng. Co., Beaver Falls, Pa.
McGowan Co., John H., Cincinnati, O.
Moffatt Machinery Mfg. Co., Charlotte, N. C.
Morris Machine Works, Baldwinville, N. Y.
Myers & Bros., F. E., Ashland, O.
Norborn Engineering Co., Philadelphia, Pa.
Sydnor Pump & Well Co., Richmond, Va.
Union Steam Pump Co., Battle Creek, Mich.
Wood & Co., R. D., Philadelphia, Pa.
Worthington, H. R., New York, N. Y.
- Punching and Shearing Machinery.**
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
Rogersford Foundry & Mach. Co., Rogersford, Pa.
- Pyrites Burners.**
Pratt Engineering & Mach. Co., Atlanta, Ga.
- Quarrying and Stonecutting Machinery.**
Ingersoll-Rand Co., New York, N. Y.
- Railings, Grilles, etc. (Brass.)**
McKenna Bros. Brass Co., Pittsburgh, Pa.
- Railroads.** (Agricultural and Industrial Opportunities.) (See Industrial, Agricultural and Commercial Opportunities.)
- Railroad Equipment and Supplies.** (New and Second-hand.)
American Frog & Switch Co., Hamilton, O.
American Locomotive Co., New York, N. Y.
American Valve & Meter Co., Cincinnati, O.
Bailey-Leiby Co., The, Charleston, S. C.
Baldwin Equipment & Supply Co., Chicago, Ill.
Benjamin Equip. Co., Harry, St. Louis, Mo.
Birmingham Rail & Loco. Co., Birmingham, Ala.
Boston Iron & Metal Co., Baltimore, Md.
Cincinnati Frog & Switch Co., Cincinnati, O.
Foster Co., L. B., Pittsburgh, Pa.
Georgia Car & Locomotive Co., Atlanta, Ga.
Hoffman & Co., R. C., Baltimore, Md.
Hyman-Michaels Co., Chicago, Ill.
Indiana Steel & Iron Co., Pittsburgh, Pa.
Kilby Frog & Switch Co., Birmingham, Ala.
Macleary, J. H., Suffolk, Va.
Males Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., New York, N. Y.
Maryland Equipment & Supply Co., Baltimore, Md.
Mathes Iron & Metal Co., G. St. Louis, Mo.
May & Turner Co., Atlanta, Ga.
National Iron & Steel Co., Houston, Tex.
Newhall Eng. Co., Geo. M., Philadelphia, Pa.
Pickett Co., Inc., H. W., Philadelphia, Pa.
Q & C Co., New York, N. Y.
Read Co., Howard, W., Philadelphia, Pa.
Robinson & Orr, Pittsburgh, Pa.
Sherwood, E. C., New York, N. Y.
Smith-Courtney Co., Richmond, Va.
Southern Iron & Equipment Co., Atlanta, Ga.
Southern Supply Co., Norfolk, Va.
Steel Rail Supply Co., The, New York, N. Y.
United States Rail Co., Cumberland, Md.
Vulcan Iron Works, Wilkes-Barre, Pa.
Weir Frog Co., Cincinnati, O.
Wilson & Co., E. H., Philadelphia, Pa.
Zelnicke Supply Co., Walter A., St. Louis, Mo.
- Railroad Frogs and Switches.**
American Frog & Switch Co., Hamilton, O.
Cincinnati Frog & Switch Co., Cincinnati, O.
Kilby Frog & Switch Co., Birmingham, Ala.
Mathes Iron & Metal Co., G. St. Louis, Mo.
May & Turner Co., Atlanta, Ga.
Robinson & Orr, Pittsburgh, Pa.
Sweet's Steel Co., Williamsport, Pa.
Weir Frog Co., Cincinnati, O.
- Railroad Tie.** (Reinforced Concrete.)
Universal Concrete Tie Co., New Orleans, La.
- Rails.** (Steel.)
Baldwin Equipment & Supply Co., Chicago, Ill.
Carnegie Steel Co., Pittsburgh, Pa.
Foster Co., L. B., Pittsburgh, Pa.
Franklin, J. E., Atlanta, Ga.
Hoffman & Co., R. C., Baltimore, Md.
Hyde Bros. & Co., Pittsburgh, Pa.
Hyman-Michaels Co., Chicago, Ill.
Indiana Steel & Iron Co., Pittsburgh, Pa.
Levin & Co., Henry, Philadelphia, Pa.
Macleary, J. H., Suffolk, Va.
Mathes Iron & Metal Co., G. St. Louis, Mo.
May & Turner Co., Atlanta, Ga.
National Iron & Steel Co., Houston, Tex.
Newhall Eng. Co., Geo. M., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Robinson & Orr, Pittsburgh, Pa.
Sherwood, E. C., New York, N. Y.
Southern Iron & Equipment Co., Atlanta, Ga.
Steel Rail Supply Co., The, New York, N. Y.
Sweet's Steel Co., Williamsport, Pa.
Tennessee Coal, Iron & R. R. Co., B'gh'm, Ala.
United States Rail Co., Cumberland, Md.
West Virginia Rail Co., The, Huntington, W. Va.
Wilson & Co., E. H., Philadelphia, Pa.
Zelnicke Supply Co., Walter A., St. Louis, Mo.
- Rail Braces, Crossings, etc.** (See R. R. Frogs and Switches.)
- Rail Joints.**
Q & C Co., New York, N. Y.
- Railways.** (Industrial.)
Chase, Fdry. & Mfg. Co., Columbus, O.
Hunt Co., C. W., West New Brighton, N. Y.
Link-Belt Co., Nictown (Philadelphia), Pa.
- Rams.** (Hydraulic.) (See Hydraulic Rams.)
- Reamers.**
Morse Twist Drill & Mch. Co., New Bedford, Mass.
- Reflectors.**
Holophane Co., Newark, Ohio.
- Refrigerating Machinery and Supplies.**
American Hub Packing Co., New York, N. Y.
- Reinforcing Bars.**
Carnegie Steel Co., Pittsburgh, Pa.
Concrete Steel Engineering Co., New York, N. Y.
Franklin Steel Co., Franklin, Pa.
- Repairing.** (Power Plants.)
Strickland Mch. Co., Richmond, Va.
- Riveters.** (Pneumatic.)
Chicago Pneumatic Tool Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
- Road Machinery.**
Austin-Western Co., Ltd., The, Chicago, Ill.
Blount, C. F., Atlanta, Ga.
Buffalo Steam Roller Co., Buffalo, N. Y.
Case Threshing Mach. Co., J. I., Racine, Wis.
Farquhar Co., Ltd., B. York, Pa.
Gallon Iron Works Co., Gallon, O.
Iroquois Iron Works, Buffalo, N. Y.
Kelly Springfield Road Roller Co., Springfield, O.
Syracuse Chilled Plow Co., Syracuse, N. Y.
Universal Road Mch. Co., Kingston, N. Y.
Western Wheeled Scraper Co., Aurora, Ill.
- Roadmaking Materials.**
Standard Oil Co., Inc., Road Oil Dept.
Texas Co., The, New York, N. Y.
- Road Roller.** (Steam.)
Austin-Western Co., Ltd., The, Chicago, Ill.
Buffalo Steam Roller Co., Buffalo, N. Y.
Case Threshing Mach. Co., J. I., Racine, Wis.
Iroquois Iron Works, Buffalo, N. Y.
Kelly Springfield Road Roller Co., Springfield, O.
Universal Road Mch. Co., Kingston, N. Y.
- Road Oil.**
Gulf Refining Co., Pittsburgh, Pa.
Prime White Road Oil Co., Cincinnati, O.
Standard Oil Co., Inc., Road Oil Dept.
Texas Co., The, New York, N. Y.
- Road Plows.**
Case Threshing Mach. Co., J. I., Racine, Wis.
Syracuse Chilled Plow Co., Syracuse, N. Y.
- Road Preservatives.**
Gulf Refining Co., Pittsburgh, Pa.
Standard Oil Co., Inc., Road Oil Dept.
Texas Co., The, New York, N. Y.
- Rock Crushers.** (See Crushers, Rock.)
- Roll Grinding and Corrugating.** (Flour Mills.)
Veatch & Co., L. R., Louisville, Ky.
- Rolled Metal Shapes.** (For Building Material Manufacturers.)
United States Metal Prod. Co., New York, N. Y.
- Rolls.** (Bending and Straightening.)
Bertsch & Co., Cambridge City, Ind.
- Roofers' and Tinners' Supplies.**
Merchant & Evans Co., Philadelphia, Pa.
- Roofing.** (Contractors for Laying.)
Dinsico & Bro., A., Pittsburgh, Pa.
- Roofing.** (Felt, Tar, Asbestos, Asphalt, Tin, etc.)
Allen, Herbert F. L., Washington, D. C.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Armstrong Mfg. Co., Richmond, Va.
Asphalt Ready Roofing Co., New York, N. Y.
Barber Asphalt Pavine Co., Philadelphia, Pa.
Barrett Mfg. Co., Philadelphia, Pa.
Carroll Portland Cement Co., Charleston, S. C.
Cameron & Barkley Co., Charleston, S. C.
Cincinnati Sheet Metal & Rfg. Co., Cincinnati, O.
Johns-Manville Co., H. W., New York, N. Y.
National Roofing Co., Tonawanda, N. Y.
Standard Paint Co., New York, N. Y.
Standard Roofing Co., Tulsa, Okla.
- Roofing.** (Metal Shingles.) (See Shingles, Metal.)
Cincinnati Sheet Metal & Rfg. Co., Cincinnati, O.
Cortright Metal Roofing Co., Philadelphia, Pa.
Edwards Mfg. Co., The, Cincinnati, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
- Roofing.** (Slate.)
East Bangor Consol. Slate Co., East Bangor, Pa.
Genuine Bangor Slate Co., Easton, Pa.
Hower, J. K., Slattington, Pa.
Johnson, E. J., New York, N. Y.
Reynolds Asphalt Shingle Co., H. M., Grand Rapids, Mich.
- Roofing Tile.**
National Roofing Tile Co., Lima, O.
- Roofing and Siding.** (Bird Sand and Chipped Slate Surfaced.)
Birmingham & Seaman Co., Chicago, Ill.
- Roofing and Siding.** (Flexible Cement, Bur-lap Inserted.)
Birmingham & Seaman Co., Chicago, Ill.
- Roofing and Siding.** (Metal.)
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Cameron & Barkley Co., Charleston, S. C.
Cincinnati Sheet Metal & Rfg. Co., Cincinnati, O.
Cortright Metal Roofing Co., Philadelphia, Pa.
Edwards Mfg. Co., The, Cincinnati, O.
Hyndman Roofing Co., Cincinnati, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
New Orleans Rfg. & Metal Wks., New Orleans, La.
Tennessee Metal Culvert Co., Nashville, Tenn.
Youngstown Sheet & Tube Co., Youngstown, O.
- Rope.**
American Mfg. Co., New York, N. Y.
Broderick & Bascom Rope Co., St. Louis, Mo.
Columbian Rope Co., Auburn, N. Y.
Plymouth Cordage Co., North Plymouth, Mass.
Turner Co., J. Spencer, New York, N. Y.
Whitlock Cordage Co., New York, N. Y.
- Rope.** (Transmission and Hoisting.)
American Mfg. Co., New York, N. Y.
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Caldwell Co., Inc., W. E., Louisville, Ky.
Columbian Rope Co., Auburn, N. Y.
Dodge Manufacturing Co., Mishawaka, Ind.
Hunt Co., C. W., West New Brighton, N. Y.
Plymouth Cordage Co., North Plymouth, Mass.
Whitlock Cordage Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
- Rope Drives.**
Brown Co., A. & F., New York, N. Y.
Caldwell Co., Inc., W. E., Louisville, Ky.
Caldwell & Son, H. W., Chicago, Ill.
Crescon Co., Geo. V., Philadelphia, Pa.
Dodge Manufacturing Co., Mishawaka, Ind.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Wood's Sons Co., T. B., Chambersburg, Pa.
- Rope Machinery.**
Hassell-Dawes Machine Co., Boston, Mass.
- Rubber Goods.**
Eureka Fire Hose Mfg. Co., New York, N. Y.
New Jersey Car Sp'g & Rub. Co., Jersey City, N. J.
- Rules.** (Steel.)
Lufkin Rule Co., The, Saginaw, Mich.
Starrett Co., L. S., Athol, Mass.
- Safes and Vaults.**
York Safe & Lock Co., York, Pa.
- Safety Appliances.** (For Elevator.)
Roth Elevator Safety Co., Inc., Baltimore, Md.
- Sand.**
Arundel Sand & Gravel Co., Baltimore, Md.
Kirkpatrick Sand & Cem. Co., Birmingham, Ala.
Lathrop & Co., C. P., Richmond, Va.
- Sand Rammers.**
Chicago Pneumatic Tool Co., Chicago, Ill.
- Sap Stain Preventive.**
Church & Dwight Co., New York, N. Y.
- Sash Chain.**
Niagara Falls Metal Stamping Works, Niagara Falls, N. Y.
- Saws.**
Gibbs Machinery Co., Columbia, S. C.
Huther Bros. Saw Mfg. Co., Rochester, N. Y.
Smith Machine Co., H. B., Smithville, N. J.
Sydnor Pump & Well Co., Richmond, Va.
- Saws.** (Band.)
Smith Machine Co., H. B., Smithville, N. J.
- Saws.** (Hack.)
Starrett Co., L. S., Athol, Mass.
- Sawmill Dogs.**
Route Steam Feed Works, Meridian, Miss.
- Sawmills.**
Appomattox Iron Wks. & Sup. Co., Petersburg, Va.
Gainesville Iron Works, Gainesville, Ga.
- Sawmill Machinery.**
Bailey-Leiby Co., Charleston, S. C.
Cameron & Barkley Co., Charleston, S. C.
Chase Turbine Mfg. Co., Orange, Mass.
Gibbs Machinery Co., Columbia, S. C.
Knight Mfg. Co., Canton, O.
Lane Mfg. Co., Montpelier, Vt.
Mecklenburg Iron Works, Charlotte, N. C.
Price Mch. Co., S. M., Norfolk, Va.
Schofield's Sons Co., J. S., Macon, Ga.
Southern Engine & Boiler Works, Jackson, Tenn.
- Saw Sharpeners.**
Abrasive Material Co., Philadelphia, Pa.
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass.
Vitrified Wheel Co., Westfield, Mass.
- Saw Sharpeners and Files.** (Cotton Gln.)
Carver Cotton Gln Co., East Bridgewater, Mass.
- Scales.**
Howe Scale Co., New York, N. Y.
Rome Scale & Mfg. Co., Rome, Ga.
Standard Scale & Supply Co., Pittsburgh, Pa.
- Screening Apparatus.**
Walker & Elliott, Wilmington, Del.
- Screens.** (Fly, Window and Door.)
Cincinnati Mfg. Co., Cincinnati, O.
New Jersey Wire Cloth Co., Trenton, N. J.
- Screens.** (Mining.)
Crescon Co., Geo. V., Philadelphia, Pa.
Erie Perforating Co., Rochester, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.
H. W. Mfg. Co., Columbus, O.
Mundt & Sons, Charles, Jersey City, N. J.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
New Jersey Wire Cloth Co., Trenton, N. J.
Waterloo Cement Mchry. Co., Waterloo, Ia.
- Sealer and Stamper.** (Envelope.)
Commercial Sales & Mfg. Co., Oberlin, O.
- Searchlights.**
Ft. Wayne Electric Works, Ft. Wayne, Ind.
- Separators.** (Dust.)
Buffalo Forge Co., Buffalo, N. Y.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
- Sewer Pipe Machinery.**
Taplin-Rice-Clerkin Co., Akron, O.
- Sewer Pipe.** (Vitrified.)
Bibb Sewer Pipe Co., Macon, Ga.
Cannelton Sewer Pipe Co., Cannelton, Ind.
Carroll Portland Cement Co., Charleston, S. C.
Chicago-Buffalo Co., Pittsburgh, Pa.
Pomona Terra-Cotta Co., Pomona, N. C.
Stevens Sons Co., H., Macon, Ga.
- Shades.**
Holophane Co., Newark, O.
- Shafting.** (Polished Steel.)
Field & Co., Inc., Philadelphia, Pa.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
- Shafting Boxes.**
Hyatt Roller Bearing Co., Newark, N. J.
- Shafting.** (See Pulleys, Shafting and Hangers.)
- Shapes.** (Rolled Steel, Brass and Bronze.)
United States Metal Prod. Co., New York, N. Y.
- Sharpening Stones.**
Norton Co., Worcester, Mass.
Vitrified Wheel Co., Westfield, Mass.
- Shears.** (Metal.)
Bertsch & Co., Cambridge City, Ind.
Rogersford Fdry. & Mach. Co., Rogersford, Pa.
- Sheet Brass and Copper.**
Husey & Co., C. G., Pittsburgh, Pa.
Merchant & Evans Co., Philadelphia, Pa.
- Sheet Metal Working Machinery.**
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
- Sheet Steel and Iron.**
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Le Belle Iron Works, Strubenville, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., B'gh'm, Ala.
Wood Iron & Steel Co., Alan, Philadelphia, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.
- Shingles.** (Asphalt Slate.)
Reynolds Asphalt Shingle Co., H. M., Grand Rapids, Mich.
- Shingles.** (Metal.)
Burriss & Co., John T., Anderson, S. C.
Carroll Portland Cement Co., Charleston, S. C.
Chattanooga Rfg. & Fy. Co., Chattanooga, Tenn.
Cincinnati Sheet Metal & Rfg. Co., Cincinnati, O.
Cortright Metal Roofing Co., Philadelphia, Pa.
Edwards Mfg. Co., Cincinnati, O.
Hyndman Roofing Co., Cincinnati, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
- Shipping Tags.**
Dennison Mfg. Co., Boston, Mass.
- Shredders.** (Bark, Chip, etc.)
Williams Pat. Crush. & Pul. Co., The, Chicago, Ill.
- Shutters.** (Iron.)
Bolles Iron & Wire Works, I. E., Detroit, Mich.
Cheapeake Iron Works, Baltimore, Md.
- Shutters.** (Steel Rolling.)
Kinneer Mfg. Co., Columbus, O.
- Shutters.** (Tin Clad.)
Victor Mfg. Co., Newburyport, Mass.
- Siding and Roofing.** (Bird Sand and Chipped Slate Surfaced.)
Birmingham & Seaman Co., Chicago, Ill.
- Signs.** (Metal Lithographed.)
Southern Can Co., Baltimore, Md.
- Signs.** (Road, Street, Outdoor, Advt.)
Indestructible Sign Co., Bishopville, S. C.
- Skylights and Cornices.**
Milwaukee Corrugating Co., Milwaukee, Wis.
New Orleans Rfg. & Metal Wks., New Orleans, La.
- Slate Roofing.** (See Roofing (Slate).)
- Slate.** (Structural, Sanitary, etc.)
Carroll Portland Cement Co., Charleston, S. C.
East Bangor Consol. Slate Co., East Bangor, Pa.
Genuine Bangor Slate Co., Easton, Pa.
Hower, J. K., Slattington, Pa.
- Sluice Gates and Appliances.**
Coldwell-Wilcox Co., Newburgh, N. Y.
- Smokestacks.** (Iron and Steel.)
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.
Keeler Co., E., Williamsport, Pa.
Lombard Iron Works, Augusta, Ga.
Petroleum Iron Works Co., Sharon, Pa.
Ruemmel-Dawley Mfg. Co., St. Louis, Mo.
Schofield's Sons Co., J. S., Macon, Ga.
Virginia Bridge & Iron Co., Roanoke, Va.
- Smokestacks.** (Steel Concrete.)
Weber Chimney Co., Chicago, Ill.

- Spikes. (Railroad.)**
Hoffman & Co., R. C., Baltimore, Md.
West Virginia Rail Co., The, Huntington, W. Va.
- Spikes. (See Nails and Spikes.)**
- Springs. (Machinery, Railway, Spiral.)**
American Steel & Wire Co., Chicago, Ill.
Cary Spring Works, New York, N. Y.
Raymond Mfg. Co., Ltd., Corry, Pa.
- Sprinklers. (Automatic.)**
General Fire Extinguisher Co., Providence, R. I.
- Sprinkler Systems. (Automatic.)**
General Fire Extinguisher Co., Providence, R. I.
- Stamp Mills.**
Mecklenburg Iron Works, Charlotte, N. C.
- Stamps. (Brass, Rubber.)**
Bennett Rubber Stamp & Seal Co., Atlanta, Ga.
- Standpipes.**
Chattanooga Boiler & Tank Co., Chat'n'g, Tenn.
Chicago Bridge & Iron Wks., Chicago, Ill.
Hartley Boiler Works, Montgomery, Ala.
Keeler Co., E., Williamsport, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Reumell-Dawley Mfg. Co., St. Louis, Mo.
- Stapling Machinery. (Fruit Package Basket, etc.)**
Barnes Machine Co., St. Joseph, Mich.
- Stationers. (Envelopes, Letter and Bills Heads, etc.)**
Young & Selden Co., Baltimore, Md.
- Steam Feeds.**
Sole Steam Feed Works, Meridian, Miss.
- Steam Fitters' Supplies.**
Saunders' Sons, D., Yorkers, N. Y.
- Steam Heating.**
Keller Co., E., Williamsport, Pa.
Peck-Hammond Co., The, Cincinnati, O.
- Steamship Lines.**
Baltimore Steam Packet Co., Baltimore, Md.
Chesapeake Steamship Co., Baltimore, Md.
Merchant & Miners' Trans. Co., Baltimore, Md.
- Steam Separators.**
Hoopes Mfg. Co., Springfield, O.
Lindstrom's Mach. Wks., John T., Allentown, Pa.
- Steam Shovel Chains.**
Welmer Chain & Iron Co., Lebanon, Pa.
- Steam Shovels. (See Excavating Machinery.)**
- Steam Specialties.**
Kennedy Valve Mfg. Co., Elmira, N. Y.
Powell Co., Wm., Cincinnati, O.
- Steam Traps.**
American Blower Co., Detroit, Mich.
Jenkins Bros., New York, N. Y.
Lindstrom's Mach. Wks., John T., Allentown, Pa.
- Steel.**
American Rolling Mill Co., Middletown, O.
Dietrich Bros., Baltimore, Md.
Field & Co., Inc., Philadelphia, Pa.
Hoffman & Co., R. C., Baltimore, Md.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
La Belle Iron Works, Steubenville, O.
Oliver Iron & Steel Co., Youngstown, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Wood Iron & Steel Co., Alan, Philadelphia, Pa.
- Steel. (Open Hearth.)**
Erie Forge Co., Erie, Pa.
- Steel. (Tool.)**
Field & Co., Inc., Philadelphia, Pa.
Jesse & Sons, Inc., Wm., St. Louis, Mo.
- Steel. (Vanadium.)**
Carnegie Steel Co., Pittsburgh, Pa.
- Steel Buildings. (Designers, Builders.)**
Amer. Bridge Co. of New York, New York, N. Y.
Champion Bridge Co., Wilmington, O.
Chesapeake Iron Works, Baltimore, Md.
Chicago Bridge & Iron Wks., Chicago, Ill.
Farris Bridge Co., Pittsburgh, Pa.
Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
Phoenix Iron Co., Philadelphia, Pa.
Roanoke Bridge Co., Roanoke, Va.
Schreiber & Sons Co., The L., Cincinnati, O.
Snead Architectural Iron Works, Louisville, Ky.
Virginia Bridge & Iron Co., Roanoke, Va.
- Steel Casting.**
Crescent Steel Castings Co., Lansdowne, Pa.
Hoffman & Co., R. C., Baltimore, Md.
Bellance Steel Casting Co., Pittsburgh, Pa.
- Steel Plate Work.**
Casey-Hedges Co., Chattanooga, Tenn.
Chattanooga Boiler & Tank Co., Chat'n'g, Tenn.
Chicago Bridge & Iron Works, Chicago, Ill.
Hoffman & Co., R. C., Baltimore, Md.
Phoenix Iron Co., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Richmond Engr. & Mfg. Co., Richmond, Va.
Reumell-Dawley Mfg. Co., St. Louis, Mo.
- Steel Protector. (Concrete Curb Steps, etc.)**
[See Protector Steel.]
- Steel Sheet Piling.**
Jones & Laughlin Steel Co., Pittsburgh, Pa.
- Stencils.**
Baltimore Office Supply Co., Baltimore, Md.
- Steps. (Extension, for Railroad Conches.)**
Lake Car Step Works, Charlotte, N. C.
- Stirrups. (Building.)**
Chesapeake Iron Works, Baltimore, Md.
- Stock Certificates, Bonds and Seals.**
Baltimore Office Supply Co., Baltimore, Md.
- Stokers. (Mechanical.)**
Babcock & Wilcox Co., New York, N. Y.
Harrisburg Fdry. & Mach. Wks., Harrisburg, Pa.
Westinghouse Machine Co., Pittsburgh, Pa.
- Storage Batteries.**
Elec. Storage Battery Co., The, Philadelphia, Pa.
Lee Electric Co., Baltimore, Md.
Westinghouse Machine Co., Pittsburgh, Pa.
- Strainers.**
Cameron Steam Pump Wks., A. S., New York, N. Y.
- Structural Steel and Iron.**
Amer. Bridge Co. of New York, New York, N. Y.
Belmont Iron Works, Inc., Philadelphia, Pa.
Champion Steel Co., Pittsburgh, Pa.
Champion Bridge Co., Wilmington, O.
Chesapeake Iron Works, Baltimore, Md.
Chicago Bridge & Iron Wks., Chicago, Ill.
Cincinnati Iron & Steel Co., Cincinnati, O.
Des Moines Bridge & Iron Co., Des Moines, Ia.
Dietrich Bros., Baltimore, Md.
- Hoffman & Co., R. C., Baltimore, Md.**
Memphis Bridge Co., Memphis, Tenn.
Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
Phoenix Iron Co., Philadelphia, Pa.
Roanoke Bridge & Iron Co., Roanoke, Va.
Roanoke Iron Works, Inc., Roanoke, Va.
Schreiber & Sons Co., The L., Cincinnati, O.
Snead Architectural Iron Works, Louisville, Ky.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Vincennes Bridge Co., Vincennes, Ind.
Virginia Bridge & Iron Co., Roanoke, Va.
York Bridge Co., York, Pa.
- Stump Pullers.**
Zimmerman Steel Co., M. R., Lone Tree, Ia.
- Sugar-Mill Machinery.**
Pratt Engineering & Mach. Co., Atlanta, Ga.
- Sulphur.**
Union Sulphur Co., New York, N. Y.
- Super-Heaters. (Steam.)**
Babcock & Wilcox Co., New York, N. Y.
Power Specialty Co., New York, N. Y.
- Surveying Instruments.**
Keuffel & Esser, Hoboken, N. J.
Weber & Co., F., Philadelphia, Pa.
- Switchboards, Switches, etc.**
Engberg's Elect. & Mech. Wks., St. Joseph, Mich.
Fort Wayne Electric Works, Fort Wayne, Ind.
General Electric Co., Schenectady, N. Y.
Westinghouse Elect. & Mfg. Co., Pittsburgh, Pa.
- Switches. (See Railroad Frogs and Switches.)**
- Switchstands.**
American Valve & Meter Co., Cincinnati, O.
Weir Frog Co., Cincinnati, O.
- Tackle Blocks. (For Wire or Manila Rope.)**
Patterson Co., W. W., Pittsburgh, Pa.
- Tags.**
Dennison Mfg. Co., Boston, Mass.
- Tanks. (Iron and Steel.)**
American Water Softener Co., Philadelphia, Pa.
Caldwell Co., Inc., W. E., Louisville, Ky.
Case Threshing Mch. Co., J. I., Racine, Wis.
Casey-Hedges Co., Chattanooga, Tenn.
Harry Bros. Co., Dallas, Tex.
Chicago Bridge & Iron Wks., Chicago, Ill.
Cole Mfg. Co., R. D., Newnan, Ga.
Des Moines Bridge & Iron Co., Des Moines, Ia.
Gem City Boiler Co., Dayton, O.
Hartley Boiler Works, Montgomery, Ala.
Keeler Co., E., Williamsport, Pa.
Kennett Co., Chicago Heights, Ill.
Lombard Iron Works, Augusta, Ga.
Lockport Boiler & Mfg. Co., Chattanooga, Tenn.
New Orleans Rfr. & Met. Wks., New Orleans, La.
Oil City Boiler Co., Oil City, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Reumell-Dawley Mfg. Co., St. Louis, Mo.
Seaford & Sons Co., Wm. B., Pittsburgh, Pa.
Schodel's Sons Co., S. J., Macon, Ga.
Sydney Pump & Well Co., Richmond, Va.
Tennessee Metal Culvert Co., Nashville, Tenn.
Virginia Bridge & Iron Co., Roanoke, Va.
Walsh & Weldner Boiler Co., Chattanooga, Tenn.
- Tanks. (Wood.)**
Baltimore Cooperage Co., Baltimore, Md.
Caldwell Co., Inc., W. E., Louisville, Ky.
Davis & Son, G. M., Palatka, Fla.
Sydney Pump & Well Co., Richmond, Va.
- Tapes. (Measuring.)**
Keuffel & Esser, Hoboken, N. J.
Larkin Rule Co., Saginaw, Mich.
Starrett Co., L. S., Athol, Mass.
- Telephones. (Supplies, Equipment.)**
Piedmont Electric Co., Asheville, N. C.
Western Electric Co., New York, N. Y.
- Telephone Cable.**
Western Electric Co., New York, N. Y.
- Telephone Poles. (See Crossies.)**
Intern'l. Croc. & Constr. Co., Galveston, Tex.
Western Electric Co., New York, N. Y.
- Terro-cotta.**
Atlanta Terra-Cotta Co., East Point, Ga.
Bibb Sewer Pipe Co., Macon, Ga.
Maryland Terra-Cotta Co., Baltimore, Md.
Pomona Terra-Cotta Co., Pomona, N. C.
Southern Building Material Co., Norfolk, Va.
Stevens' Sons Co., H., Macon, Ga.
- Threshers.**
Cardwell Machine Co., Richmond, Va.
Case Threshing Mch. Co., J. I., Racine, Wis.
- Tie Plates. (Railways.)**
Virginia Railway Supply Co., Norfolk, Va.
- Tile. (Drain, Floor, etc.)**
Amer. Enam. Brick & Tile Co., New York, N. Y.
Bibb Sewer Pipe Co., Macon, Ga.
Oconee Brick & Tile Co., Milledgeville, Ga.
- Tile. (Mosaic.)**
Dagostin & Angelini Bros., Montgomery, Ala.
Southern Mosaic Tile Co., Birmingham, Ala.
- Tile. (Roofing.)**
National Roofing Tile Co., Lima, O.
- Tin and Terne Plates.**
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Merchant & Evans Co., Philadelphia, Pa.
- Tobacco Machinery.**
Buckeye Iron & Brass Works, Dayton, O.
Cardwell Machine Co., Richmond, Va.
- Tool Steels.**
Jesse & Sons, Inc., Wm., St. Louis, Mo.
- Tools. (Mechanists.)**
Manning, Maxwell & Moore, Inc., New York, N. Y.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
- Tools. (Mechanical.)**
Starrett Co., L. S., Athol, Mass.
- Tools. (Pneumatic.)**
Amer. Compressor & Pump Co., Baltimore, Md.
Chicago Pneumatic Tool Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
- Torches.**
Wall Mfg. Supply Co., P., Allegheny, Pa.
- Towers. (Steel and Wood.)**
Baltimore Cooperage Co., Baltimore, Md.
Caldwell Co., Inc., Wm. E., Louisville, Ky.
Chattanooga Boiler & Tank Co., Chat'n'g, Tenn.
Chicago Bridge & Iron Wks., Chicago, Ill.
Cole Mfg. Co., R. D., Newnan, Ga.
Des Moines Bridge & Iron Co., Des Moines, Ia.
- Traction Engines.**
Case Threshing Mch. Co., J. I., Racine, Wis.
- Tramway. (Overhead.)**
Northern Engineering Works, Detroit, Mich.
Spindel, J. G., Reading, Pa.
- Tramway. (Wire Rope.)**
Broderick & Bascom Rope Co., St. Louis, Mo.
Caldwell & Sons Co., H. W., Chicago, Ill.
Link-Belt Co., Nictown (Philadelphia), Pa.
- Transformers.**
Crocker-Wheeler Co., Ampere, N. J.
Moloney Electric Co., St. Louis, Mo.
Triumph Electric Co., Cincinnati, O.
- Transmission Line Supplies. (Electric.)**
Electrical Engineers' Equip. Co., Chicago, Ill.
- Trench Excavator.**
American Steel Dredge Co., Ft. Wayne, Ind.
Fairbanks Steam Shovel Co., Marion, O.
Monaghan Machine Co., Chicago, Ill.
- Trucks. (Motor.)**
International Motor Co., New York, N. Y.
- Trucks. (Platform, Freight, Mill, Factory, etc.)**
Chase Fdry. & Mfg. Co., Columbus, O.
Clark Co., Geo. P., Windsor Locks, Conn.
Howe Scale Co., New York, N. Y.
Rome Scale & Mfg. Co., Rome, Ga.
- Trucks. (Storage Battery Auto.)**
Westinghouse Machine Co., Pittsburgh, Pa.
- Trucks. (Wood and Steel for Portable Machinery.)**
Empire Manufacturing Co., Quincy, Ill.
- Trust Companies. (See Bankers and Brokers.)**
- Tube Well Strainers.**
Cook Well Co., St. Louis, Mo.
- Tubes. (Boiler.)**
Cincinnati Iron & Steel Co., Cincinnati, O.
National Tube Co., Pittsburgh, Pa.
- Tubing.**
Field & Co., Inc., Philadelphia, Pa.
La Belle Iron Works, Steubenville, O.
National Tube Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.
- Turbines. (Hydraulic.)**
Allis-Chalmers Co., Milwaukee, Wis.
Davis Foundry & Machine Works, Rome, Ga.
Dayton Globe Iron Works Co., Dayton, O.
Lefel & Co., James, Springfield, O.
Poole Engineering & Mach. Co., Baltimore, Md.
Smith Co., S. Morgan, York, Pa.
Trump Mfg. Co., Springfield, O.
- Turbines. (Steam.)**
Allis-Chalmers Co., Milwaukee, Wis.
De Laval Steam Turbine Co., Trenton, N. J.
Ft. Wayne Electric Works, Ft. Wayne, Ind.
General Electric Co., Schenectady, N. Y.
Southward Fdry. & Mch. Co., Philadelphia, Pa.
Terry Steam Turbine Co., New York, N. Y.
Western Electric Co., New York, N. Y.
Westinghouse Machine Co., Pittsburgh, Pa.
- Turntables.**
Virginia Bridge & Iron Co., Roanoke, Va.
- Turpentine.**
Atlantic Turpentine & Refin'g Co., Savannah, Ga.
- Tuyeres. (Copper and Bronze.)**
Keystone Bronze Co., Pittsburgh, Pa.
- Twine.**
American Manufacturing Co., New York, N. Y.
Columbian Rope Co., Auburn, N. Y.
Plymouth Cordage Co., North Plymouth, Mass.
Turner Co., J. Spencer, New York, N. Y.
Whitlock Cordage Co., New York, N. Y.
- Twine Machinery.**
Haskell-Dawson Machine Co., Boston, Mass.
- Twisting Machinery.**
Haskell-Dawson Machine Co., Boston, Mass.
- Unions.**
Dart Manufacturing Co., E. M., Providence, R. I.
- Vacuum Cleaning Apparatus.**
Blaisdell Machinery Co., Bradford, Pa.
- Valves.**
Bourbon Copper & Brass Wks. Co., Cincinnati, O.
Columbian Iron Works, Chattanooga, Tenn.
Fricker Co., The, Waynesboro, Pa.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
National Tube Co., Pittsburgh, Pa.
Powell Co., Wm., Cincinnati, O.
York Mfg. Co., York, Pa.
- Varnish.**
Berry Bros., Ltd., Detroit, Mich.
Glidden Varnish Co., Cleveland, O.
- Veneer Machines.**
Titus, E. E., Petersburg, Va.
- Ventilating Apparatus. (Engineers' and Contractors.)**
American Blower Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Peck-Hammond Co., Cincinnati, O.
Sturtevant Co., B. F., Hyde Park, Mass.
- Ventilators.**
Merchant & Evans Co., Philadelphia, Pa.
- Wagons. (Dump.)**
Columbia Wagon Co., Columbia, Pa.
Eagle Wagon Works, Auburn, N. Y.
Troy Wagon Works Co., Troy, O.
Western Wheeled Scraper Co., Aurora, Ill.
- Wagons. (Ice, Bakers' and Laundry.)**
Koenig & Lohrs Wagon Co., Quincy, Ill.
- Wall Plaster.**
King & Co., J. B., New York, N. Y.
- Wall Plugs. (Galvanized.)**
Niagara Falls Metal Stamping Works, Niagara Falls, N. Y.
Wicks Mfg. Co., Milton, O., Glen Cove, N. Y.
- Wall Ties.**
Niagara Falls Metal Stamping Works, Niagara Falls, N. Y.
Page Woven Wire Fence Co., Adrian, Mich.
- Washers. (Fire and Phosphate.)**
Bailey-Leiby Co., Charleston, S. C.
Cameron & Barkley Co., Charleston, S. C.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
- Washers. (Water-Power for Clothes.)**
Bates & Bros. Co., D. L., Dayton, O.
- Washers and Rivets. (See Bolts, Nuts, Rivets, Studs and Washers.)**
- Water Filters. (See Filters, Water, for Domestic and Industrial Purposes.)**
- Water Meters.**
American Valve & Meter Co., Cincinnati, O.
- Waterproofing. (For Brick Work.)**
Barrett Mfg. Co., Philadelphia, Pa.
Carolina Portland Cement Co., Charleston, S. C.
Ceresit Waterproofing Co., Chicago, Ill.
National Roofing Co., Tonawanda, N. Y.
- Waterproofing. (For Cement Mortar.)**
Ceresit Waterproofing Co., Chicago, Ill.
- Waterproofing. (For Concrete.)**
Barrett Mfg. Co., Philadelphia, Pa.
Ceresit Waterproofing Co., Chicago, Ill.
National Roofing Co., Tonawanda, N. Y.
- Waterproof Compound. (Liquid.)**
Carolina Portland Cement Co., Charleston, S. C.
National Roofing Co., Tonawanda, N. Y.
- Water-Softening Apparatus. (Purifying.)**
American Water Softener Co., Philadelphia, Pa.
Dodge Manufacturing Co., Mishawaka, Ind.
Gem City Boiler Co., Dayton, O.
Kennett Co., Chicago Heights, Ill.
N. Y. Cont. Jewell Filtr'n Co., New York, N. Y.
Roberts Filter Mfg. Co., Philadelphia, Pa.
Scott & Sons Co., Wm. B., Pittsburgh, Pa.
Tucker & Laxton, Charlotte, N. C.
- Water Supply Systems. (Town, Home, Railroad, etc.)**
Rife Engine Co., New York, N. Y.
- Water-Wheels. (See Turbines. (Hydraulic.))**
- Water-Works Supplies and Appliances.**
American Cast Iron Pipe Co., Birmingham, Ala.
American Pipe & Constr. Co., Philadelphia, Pa.
Bibb Sewer Pipe Co., Macon, Ga.
Blount, C. F., Atlanta, Ga.
Bourbon Copper & Brass Wks. Co., Cincinnati, O.
Caldwell-Wilcox Co., Newburgh, N. Y.
Columbian Iron Works, Chattanooga, Tenn.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Keystone Pump & Well Eng. Co., Beaver Falls, Pa.
Lendite Co., The, Philadelphia, Pa.
McWane Pipe Works, Lynchburg, Va.
Pomona Terra-Cotta Co., Pomona, N. C.
Stevens' Sons Co., H., Macon, Ga.
U. S. Cast Iron Pipe & Fdry. Co., New York, N. Y.
- Weigher. (Recording Liquid.)**
Worthington, Henry R., New York, N. Y.
- Well Contractors. (Oil, Artesian, etc.)**
Cook Well Co., The, St. Louis, Mo.
Hughes Specialty Well Drill Co., Charleston, S. C.
Stothoff Bros., Flemington, N. J.
Sydney Pump & Well Co., Richmond, Va.
- Well Tools and Supplies.**
Cook Well Co., The, St. Louis, Mo.
Keystone Pump & Well Eng. Co., Beaver Falls, Pa.
Williams Bros., Ithaca, N. Y.
- Wheels and Axles.**
Empire Manufacturing Co., Quincy, Ill.
Oliver Mfg. Co., W. J., Knoxville, Tenn.
- Wheelbarrows and Trucks.**
Syracuse Chilled Plow Co., Syracuse, N. Y.
- Wheels. (Steel and Steel Tired.)**
Carnegie Steel Co., Pittsburgh, Pa.
Empire Manufacturing Co., Quincy, Ill.
- Window Frames and Sashes. (Fireproof.)**
Detroit Steel Products Co., Detroit, Mich.
United States Metal Prod. Co., New York, N. Y.
Voigtmann & Co., Chicago, Ill.
- Window Guards. (Wire.)** [See Wire Goods.]
- Windmills.**
Baltimore Cooperage Co., Baltimore, Md.
Caldwell Co., Inc., W. E., Louisville, Ky.
- Wire Insulating.**
General Electric Co., Schenectady, N. Y.
- Wire. (Barbed Wire, etc.)**
American Steel & Wire Co., Chicago, Ill.
Roebeling's Sons Co., J. A., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.
- Wire Cloth. (Iron, Steel, Brass, etc.)**
American Steel & Wire Co., Chicago, Ill.
Caldwell & Sons Co., The H. W., Chicago, Ill.
Diamond Wire Products Co., Columbus, O.
Meyers Mfg. Co., Fred J., Hamilton, O.
New Jersey Wire Cloth Co., Trenton, N. J.
- Wire Goods.**
Bolles Iron & Wire Works, J. E., Detroit, Mich.
Cincinnati Mfg. Co., Cincinnati, O.
Diamond Wire Products Co., Columbus, O.
Dow Wire Works Co., Louisville, Ky.
Dufur & Co., Baltimore, Md.
Dufur, Baggett & Co., Baltimore, Md.
Meyers Mfg. Co., The, Fred J., Hamilton, O.
New Jersey Wire Cloth Co., Trenton, N. J.
- Wire Netting.**
American Steel & Wire Co., Chicago, Ill.
New Jersey Wire Cloth Co., Trenton, N. J.
- Wire Rope.**
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Contractors' Plant Mfg. Co., Inc., Buffalo, N. Y.
Roebeling's Sons Co., J. A., Trenton, N. J.
Williamsport Wire Rope Co., Williamsport, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.
- Wire Rope Clips.**
American Hoist & Derrick Co., St. Paul, Minn.
- Wire Rope Thimbles.**
Broderick & Bascom Rope Co., St. Louis, Mo.
- Wood Blocks. (For Paving and Factory Floors.)**
U. S. Wood Preserving Co., New York, N. Y.
- Woodboring Machines.**
Chicago Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
- Wood-Fiber Plaster.**
King & Co., J. B., New York, N. Y.
- Wood Pipe. (For Water, etc.)**
Wyckoff & Son Co., A., Elmira, N. Y.
- Woodworking Machinery.**
Gibbs Machinery Co., Columbia, S. C.
Kline, Lewis T., Alpena, Mich.
Knight Mfg. Co., Canton, O.
Lane Mfg. Co., Montpelier, Vt.
Ober Mfg. Co., Chagrin Falls, O.
Shimer & Sons, Samuel J., Milton, Pa.
Smith-Courtney Co., Richmond, Va.
Smith Machine Co., H. B., Smithville, N. J.
- Yarn. (Tarred Sisal.)**
American Manufacturing Co., New York, N. Y.
Columbia Rope Co., Auburn, N. Y.
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American Mfg. Co.	75	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
American Process Co.	38	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
American Pulley Co., The	16	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
American Railway Supply Co.	115	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
American Rolling Mill Co.	115	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
American Sheet & Tin Plate Co.	40	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
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Anderson, R. B.	80	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
Angle, Geo. W.	20	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
Annapolis Iron Works & Sup.	96	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
Arnold, C. H.	20	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
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Arnold, C. H.	20	Cincinnati Sheet Metal & Roofing Co.	36					Northern, Willard C.	30	Standard Portland Cement Co.	
Arnold, C. H.	20	Cincinnati Sheet									



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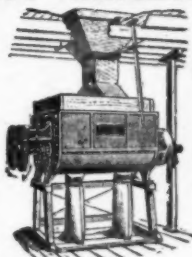


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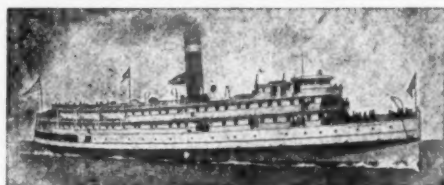


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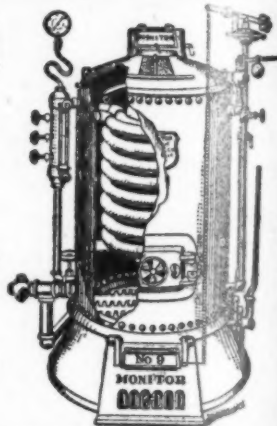
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THIRTIETH ANNIVERSARY ISSUE

U. S. Department of Commerce

Manufacturers RECORD



FEBRUARY · 22
1912

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CORRECTIONS.—In the table of wheat production in 32 years on page 27 the total for the United States should read 17,473,784,000, and lines 22, 23 and 24 in the second column of the page should read "the rest of the country raised 14,525,425,000 bushels, or an annual average of 453,919,000 bushels." The total of the South's coal production in 32 years on page 38 should read 1,522,578,539.





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THIRTY YEARS OF SOUTHERN UPBUILDING

Copyright, 1912, by the Manufacturers Record Publishing Company.

BALTIMORE, FEBRUARY 22, 1912

Manufacturers Record.

PUBLISHED EVERY THURSDAY BY THE
MANUFACTURERS RECORD PUBLISHING COMPANY
BALTIMORE

ISSUED THIS WEEK IN TWO PARTS--PART II

[Entered at the Baltimore Postoffice as second-class matter.]

BALTIMORE, FEBRUARY 22, 1912.

The Reason for This Publication

WHAT has the South in the way of natural advantages? What are its resources? What has it achieved, and what of its future? Have the predictions of the MANUFACTURERS RECORD about the South, made during the last thirty years, been fulfilled?

These are questions the world has a right to ask.

We have undertaken to answer them here. In celebration of its thirtieth birthday the MANUFACTURERS RECORD publishes this issue in two sections. Section I is devoted to the regular work of the paper, while Section II, under the general heading of "Thirty Years of Southern Upbuilding," covers the story of what the South has, what it has achieved and what it is destined to do in the future.

In a more elaborate statistical and descriptive review than was ever made, as far as our knowledge goes, of any section of this or any other country, the story of the South's progress since 1880 is set forth. In this we have given the details of the sixteen Southern States and the progress of leading activities by years and by decades and for the entire period in comparison with the whole country. And then, in order that the world may see the South as many of the foremost men of this country see it, we give the views of members of the Cabinet and other men in public life, Government experts and leaders in the industrial and financial interests of the country.

It has seemed to us that in no other way could the MANUFACTURERS RECORD accomplish a greater work for the South than to follow up the account of what has been done with these expressions of opinion and the special articles written not by Southern men, except in very rare instances, but by men of other sections.

For thirty years the MANUFACTURERS RECORD has presented weekly to the world illuminating facts and figures regarding the South and its possibilities. For the upbuilding of the South it was established, and to that end it has labored unceasingly.

Now that the world's attention, by reason of the cumulative effect of all that has been done in Southern upbuilding, is being centered upon this section, it has seemed appropriate through this issue to cover broadly the whole South and the many phases of its resources and activities.

In studying this issue we trust that our readers in America, as well as abroad, will give due heed to the exceptionally interesting and valuable information found in our advertising pages. In the advertisements of cities and towns and railroads and business enterprises there is a vast amount of valuable information, and those who do not read these advertising pages with as much care as they do the reading pages of this issue will miss many of the most interesting things to be found in this publication.

One of the Marvels of American Civilization



IN THIS year, 1912, less than half a century since the close of a four years' devastating war and only thirty years removed from the days of revival of its energies, the sixteen States of the South, including Missouri and Oklahoma, are annually—

Using \$3,397,000,000 manufacturing capital in producing goods to the value of \$3,800,000,000

Yielding \$3,000,000,000 in agriculture from lands valued, with their necessary buildings, at \$8,971,000,000

Cutting 21,000,000,000 feet, board measure, of lumber to the value of \$450,000,000

Deriving \$370,000,000 of wealth from mines, wells and quarries.

Employing \$13,000,000 of capital in salt-water and fresh-water fisheries that bring in \$20,000,000.

Here is productivity aggregating nearly \$7,300,000,000 a year. A few of its items show its diversity and range. They include—

\$295,000,000 invested in cotton mills with 11,336,898 spindles and 239,186 looms, consuming 1,143,033,633 pounds of cotton

\$97,000,000 invested in cottonseed oil mills having crude products valued at \$145,000,000.

3,000,000 tons of pig iron from the furnaces.

9,000,000 tons of coke turned out from the ovens

15,000,000 bales of cotton valued with the seed at \$875,000,000.

1,273,837,000 bushels of corn, wheat and oats valued at \$900,000,000

\$45,000,000 of the products of the sugar cane

23,000,000 bushels of rice

\$100,000,000 worth of fruits and vegetables sold in Northern and Western markets

\$70,000,000 of tobacco

115,000,000 tons of bituminous coal

85,000,000 barrels of petroleum

6,000,000 tons of iron ore

2,700,000 tons of phosphate rock

300,000 tons of sulphur

375,000 tons of lead and zinc.

The South's railroads have an aggregate length of 88,903 miles.

Its National banks, with \$236,853,850 capital, have \$1,925,184,627 aggregate resources and \$957,428,510 individual deposits, while there are \$1,184,045,949 such deposits in State and private banks, savings banks and loan and trust companies.

Through Southern ports pass \$747,822,348 of exports in foreign trade, or more than one-third of the total exports of the country, and of that total more than two-fifths originate in the South.

The value of exports in the past fiscal year from one Southern port, ranking in exports next to New York, was more than twice that of exports from all the Pacific ports of this country and \$23,000,000 more than the value of their combined exports and imports.

The \$2,140,000,000 of individual deposits in its banks, the \$3,397,000,000 invested in manufacturing and the \$8,971,000,000 invested in farm lands and buildings constitute something more than half the true wealth of the South, \$27,500,000,000.

In some lines the South has produced more in a year and in some less than the amounts named in these conservative estimates of the production in 1911; for instance, the cotton crop, with seed, of the season ended August 31, 1911, having been worth \$1,030,-

000,000, as compared with the \$875,000,000 value of the much larger crop of the season of 1911-12 now being marketed. Enormous as many of these amounts are, their real significance appears only in comparing them with production at other times in the United States as a whole.

The present wealth of the South is \$11,000,000,000 greater than the wealth of the country in 1860, though the South's population now is only 1,606,600 greater than the country's was then.

That near-equality in the numbers of the populations emphasizes the fact that the South produced last year 241,385,000 more bushels of corn than the country harvested in 1860.

Even more significant, perhaps, is comparison of the South today with the country in 1880.

Its manufacturing capital is \$510,000,000 greater than capital so invested in the United States in 1880.

Its investment in farm lands and buildings is within \$1,226,000,000 of such value in the whole country in 1880, although the area of improved farm land in the South is 110,789,000 acres less than the 284,771,000 of such acres in the whole country thirty-two years ago.

Its lumber cut, now more than half the annual cut of the country, is 3,000,000,000 feet greater than the country's in 1880.

Its agricultural products are worth at least \$600,000,000 more than the country's in 1880.

Its cotton crop, with seed, in the season ended August 31, 1911, had a value more than twice as great as the value of the output of all the gold mines of the world and \$457,352,397 greater than the combined values of the outputs of the gold mines and silver mines of the world in the calendar year 1910. The raw cotton exported in that season was worth \$122,696,865 more than the gold produced in the calendar year.

There was a difference in favor of the South of nearly \$5,000,000 in value between the country's mineral production in 1880 and the South's in 1910.

In 1910 its coal output had a greater value than the output of all the gold and silver mines of the country, and the South mined more bituminous coal than all the bituminous and anthracite coal mined in the United States in 1884, and its 1911 output of bituminous coal was nearly three times that of the country's in 1880.

About the same record has been made in the production of petroleum, the oil wells of the South now yielding more than three times as much as did those of the whole country in 1880.

The South has not yet equaled the country's production of pig-iron in 1880, which was 3,835,191 tons, but the 3,525,119 tons made by that section in 1906 was a close approach to the earlier national record.

In textiles, however, there is a different situation, Southern cotton mills having 683,463 more spindles and 13,427 more looms than all the mills in the country had in 1880 and using 392,689,652 more pounds of American-grown cotton, and more than half the amount used in the United States today.

The 88,903 miles of railroad in the South are 4359 miles less than the railroad mileage of the country in 1880, but it should be borne in mind that the South has now one mile of railroad for every 10.7 square miles of its territory, whereas the country's mileage at the earlier date averaged only one mile of railroad for every 31.9 square miles of area.

The South, having little capital available for banking between 1865 and 1880, was slow to fall in with the National bank system, its capital invested in that way in 1880 being a little more than 11 per cent. of the total National bank capital and its individual deposits in National banks being less than 9 per cent. of the total of such deposits. Now, though, while this capital in the South is still less than the total in the country in 1880, the individual deposits in National banks in the South are \$83,890,873 greater than the country's thirty-two years ago.

The South of today compared with the South of 1880 is one of the marvels of American civilization. The greatness of the facts in the comparison, or rather in the contrast, so marked is the difference, becomes more manifest when the South of today and the United States of 1880 are compared. The story of the development of thirty-odd years that has placed the South, with only 31.8 per cent. of the total land area of continental United States and with a population about equal to the population of the country in 1860, so far in advance on so many lines of the position

occupied by the country in 1880 has all the elements of attraction in a thrilling romance, though demonstrating that facts are stranger than fiction. It is told, with due regard for detail and for broad effect, in the pages that follow, and it justifies, in every particular, the optimistic forecasts of the South's future given by experts in their various fields and by leading men of affairs in other parts of the country who are interested in the growth of the South as essential to the development of the whole country.

Definite Achievements of the South Since 1880



ANY as were the difficulties with which the South was confronted as it advanced toward its present position of prosperity, they served two main purposes. Instead of baffling courage and energy, they were really spurs to greater endeavor and persistence, and, viewed in retrospect, they emphasize the definite achievements of the South since 1880.

In the past thirty-two years, with its population increasing in number by 14,434,975, the South has—

Added \$3,068,000,000 to its capital invested in manufacturing.

Increased the value of its farm lands and their improvements by \$6,758,910,000 and the area of its improved farm acreage by 72,006,825 acres.

Cut 352,721,000,000 feet of lumber.

Harvested 30,503,926,000 bushels of leading grains, of which 24,485,309,000 were corn, 3,070,258,000 oats and 2,948,359,000 wheat, in addition to all the rice grown in the country now averaging from 18,000,000 to 20,000,000 bushels a year.

Marketed 288,588,439 bales of cotton, increasing the annual production from 5,761,252 bales to 12,120,095 bales in the season ended August 31, 1911, and to more than 15,000,000 bales in the present season.

Added \$93,200,000 to the capital invested in cottonseed-oil mills.

Made 63,168,000 tons of pig-iron and 140,000,000 tons of coke.

Mined 1,523,000,000 tons of coal.

Dug 121,300,000 tons of iron ore.

Sold 37,700,000 tons of its pebble and rock phosphate.

Produced 715,000,000 barrels of petroleum.

Increased its capital in the textile industry by \$274,000,000, representing 10,649,832 more spindles and 214,432 more looms than it had in 1880, which are using 1,031,256,456 more pounds of raw cotton now than then.

Swelled the resources of its national banks by \$1,731,100,168, their capital by \$182,964,920 and their individual deposits by \$884,303,987, with individual deposits in other of its financial institutions increasing in the same time by \$1,066,605,458, a total increase of such deposits in all banks of \$1,950,909,445.

Constructed 64,037 miles of railroad in addition to double tracking several thousand miles.

Spent \$1,000,000,000 upon its common schools.

Sent through its ports to foreign lands merchandise valued at \$12,859,739,040 and received through them from abroad merchandise valued at \$2,014,671,812.

Its exports have constituted nearly 35 per cent. of the total exports of merchandise from the country, and of that total \$9,121,639,360, or nearly 25 per cent., represent the value of the exports of raw cotton alone. The value of those cotton exports was \$1,949,261,060 greater than the value of the world's output of gold in the thirty-two years, and the value of the thirty-two cotton crops, with their seed, which was \$15,514,000,000, was \$5,001,350,158 greater than the world's production of gold and silver in the same period.

Though there has been comparatively little change in the proportionate exports of cotton, the difference being only that between 68 per cent. of the total American crop in 1880 and 64.1 per cent. in 1911, there has been a radical shift in the relative positions of the Southern mills and of those in the rest of the country. In the period under review mills in the rest of the country consumed 61,916,938 bales of the commercial crops and Southern mills 37,532,673 bales. But whereas in 1880 the 179,000 bales consumed by Southern mills were but a little more than 10 per cent. of the American consumption of cotton, in 1911 Southern mills used 54.2 per cent. of the American consumption, meanwhile having used

in three other years more cotton than the mills in the rest of the country.

It is not surprising that such achievements have been recorded in an addition of \$18,323,000,000 to the estimated true value of Southern property, that increase actually being in amount \$2,163,000,000 greater than the wealth of the whole country in 1860 and nearly twice the value of Southern property in 1880.

The strides that the South has made in performing these deeds of material progress are epitomized statistically in the following table:

SOUTHERN UPBUILDING IN THIRTY-TWO YEARS.

	1880.	1911.*	Increase Per Cent.
Population	18,614,925	33,049,900	77.5
Manufactures:			
Capital	\$329,753,000	\$3,397,000,000	930.1
Products, value.....	\$622,840,000	\$3,800,000,000	510.1
Cotton Mills:			
Capital	\$21,000,000	\$295,000,000	1,304.7
Spindles	687,066	11,336,898	1,550.0
Looms	14,754	239,186	1,521.1
Cotton used, pounds.....	111,777,177	1,143,033,633	922.6
Cottonseed Oil Mills:			
Capital	\$3,800,000	\$97,000,000	2,452.7
Products, value.....	\$6,797,261	\$145,000,000	2,033.2
Pig-iron made, tons.....	448,978	3,011,386	570.7
Coke made, tons.....	373,982	9,000,000	2,306.5
Lumber products, value.....	\$41,000,000	\$450,000,000	997.6
Lumber cut, feet.....	3,810,038,000	21,000,000,000	451.2
Fisheries:			
Capital	\$9,497,306	\$13,000,000	36.9
Products, value.....	\$10,830,281	\$20,000,000	84.7
Farm products, value.....	\$756,000,000	\$3,000,000,000	296.8
Farm lands, buildings, value	\$2,212,173,481	\$8,971,083,000	305.5
Cotton: †			
Bales	5,761,252	12,120,095	110.4
Value—with seed	\$325,000,000	\$1,030,000,000	216.9
Corn, wheat, oats, bushels...	792,669,000	1,273,837,000	60.7
Cattle, sheep, swine.....	45,686,000	53,000,000	16.0
Mineral products, value.....	\$18,225,508	\$370,000,000	1,930.1
Coal mined, tons.....	7,002,254	115,000,000	1,542.3
Iron ore mined, tons.....	702,515	6,000,000	754.1
Petroleum, barrels.....	179,000	85,000,000	47,386
Phosphate, tons.....	190,763	2,700,000	1,315.3
Railroad mileage.....	24,866	88,903	257.5
Exports	\$264,905,753	\$747,822,348	182.3
National Banks:			
Resources	\$194,084,459	\$1,925,184,627	891.9
Capital	\$53,888,930	\$236,853,850	339.5
Individual deposits.....	\$73,124,523	\$957,428,510	1,209.3
Other banks, deposits.....	\$117,440,491	\$1,184,045,949	908.1
Common school expenditures.	\$12,471,404	\$78,000,000	525.5
Property, true value.....	\$9,177,000,000	\$27,500,000,000	199.6

*Partly estimated. †Season ended August 31.

In review the increases are worthy of being noted as follows:
Population from 18,614,925 to 33,049,900, or by 14,434,975, equal to 77.5 per cent.

Capital invested in manufacturing, from \$329,753,000 to \$3,397,000,000, or by \$3,067,247,000, equal to 930.1 per cent.

Value of products of manufacturing, from \$622,840,000 to \$3,800,000,000, or by \$3,177,160,000, equal to 510.1 per cent.

Capital invested in cotton mills, from \$21,000,000 to \$295,000,000, or by \$274,000,000, equal to 1304.7 per cent.

Number of spindles, from 687,066 to 11,336,898, or by 10,649,832, equal to 1550 per cent.

Number of looms, from 14,754 to 239,186, or by 224,432, equal to 1521.1 per cent.

Number of pounds of cotton used, from 111,777,177 to 1,143,033,633, or by 1,031,256,456, equal to 922.6 per cent.

Capital invested in cottonseed-oil mills, from \$3,800,000 to \$97,000,000, or by \$93,200,000, equal to 2452.7 per cent.

Value of products of cottonseed-oil mills, from \$6,797,261 to \$145,000,000, or by \$138,202,739, equal to 2033.2 per cent.

Pig-iron made, from 448,978 tons to 3,011,386 tons, or by 2,562,408 tons, equal to 570.7 per cent.

Coke made, from 373,982 tons to 9,000,000 tons, or by 8,626,018 tons, equal to 2306.5 per cent.

Value of lumber products, from \$41,000,000 to \$450,000,000, or by \$409,000,000, equal to 997.6 per cent.

Lumber cut, from 3,810,038,000 feet to 21,000,000,000 feet, or by 17,189,962,000 feet, equal to 451.2 per cent.

Capital invested in fisheries, from \$9,497,306 to \$13,000,000, or by \$3,502,694, equal to 36.9 per cent.

Value of the products of fisheries, from \$10,830,281 to \$20,000,000, or by \$9,169,719, equal to 84.7 per cent.

Value of farm products, from \$756,000,000 to \$3,000,000,000, or by \$2,244,000,000, equal to 296.8 per cent.

Value of farm lands with improvements, from \$2,212,173,481 to \$8,971,083,000, or by \$6,758,909,519, equal to 305.5 per cent.

Crop of cotton, from 5,761,252 bales to 12,120,095 bales, or by 6,358,843 bales, equal to 110.4 per cent.

Value of cotton crop with its seed, from \$325,000,000 to \$1,030,000,000, or by \$705,000,000, equal to 216.9 per cent.

Corn, wheat and oats crops, from 792,669,000 bushels to 1,273,837,000 bushels, or by 481,168,000, equal to 60.7 per cent.

Number of cattle, sheep and swine, from 45,686,000 to 53,000,000, or by 7,314,000, equal to 16 per cent.

Value of mineral products, from \$18,225,508 to \$370,000,000, or by \$351,774,492, equal to 1930.1 per cent.

Coal mined, from 7,002,254 tons to 115,000,000 tons, or by 107,997,746 tons, equal to 1542.3 per cent.

Iron ore mined, from 702,515 tons to 6,000,000 tons, or by 5,297,485 tons, equal to 754.1 per cent.

Petroleum produced, from 179,000 barrels to 85,000,000 barrels, or by 84,821,000 barrels, equal to 47,386 per cent.

Phosphate mined, from 190,763 tons to 2,700,000 tons, or by 2,509,237 tons, equal to 1315.3 per cent.

Length of railroads, from 24,866 miles to 88,903 miles, or by 64,037 miles, equal to 257.5 per cent.

Value of exports, from \$264,905,753 to \$747,822,348, or by \$482,916,595, equal to 182.3 per cent.

Resources of National banks, from \$194,084,459 to \$1,925,184,627, or by \$1,731,100,168, equal to 891.1 per cent.

Capital of National banks, from \$53,888,930 to \$236,853,850, or by \$182,964,920, equal to 339.5 per cent.

Individual deposits in National banks, from \$73,124,523 to \$957,428,510, or by \$884,303,987, equal to 1209.3 per cent.

Deposits in other financial institutions, from \$117,440,491 to \$1,184,045,949, or by \$1,066,605,458, equal to 908.1 per cent.

Expenditures for common schools, from \$12,471,404 to \$78,000,000, or by \$65,528,596, equal to 525.5 per cent.

Estimated true value of property, from \$9,177,000,000 to \$27,500,000,000, or by \$18,323,000,000, equal to 199.6 per cent.

The rates of increase in these many lines show not only from what small beginnings the revival of Southern energies was made, but also the remarkable results from their exercise.

Turning Prosperity to Good Account



AS the wealth of the South has increased in the past thirty-two years it has been used right by the South. The increase in the estimated wealth of the South has been from \$9,177,000,000 to \$27,500,000,000. The figures, as shown in detail on another page of this issue, reflect the prosperity of the ten years between 1880 and 1890 consequent upon revived manufacturing and agricultural activities, and also the effects of the depressing price of cotton in the years between 1890 and 1900, in which the increase in wealth was less than in the preceding decade. Again, the period of high prices generally and record-breaking material progress in the first ten years of the present century, in spite of two or three years of halting, left its mark in the figures of accumulated wealth.

Mere acquisition of wealth, however, has not been a dominating influence in the South. As the chance has been given to use money, it has been spent liberally by State, county and municipal governments, by corporations and by individuals upon improvements of all kinds. The increase in the value of farm buildings in ten years from \$855,000,000 to \$1,673,000,000 is typical of the general movement manifested also in the building of first-class roads, the erection of public buildings, the rising sky-line in city architecture, the betterment of railroad facilities. In no particular has the broadminded spirit of the South been better shown than in the expenditures for common schools, which increased between 1880 and 1909 from \$12,471,404 to \$72,731,604, or at the rate of 483 per cent., against an increase in wealth of 199.6 per cent.

Just as soon as it was able and, indeed, at great sacrifice, the South's interest in education resumed on a wider basis the practical demonstration it had given for many years before the war. With expenditures for common schools increasing between 1880

and 1890 in the rest of the country at the rate of 76 per cent., the increase in the South was at the rate of 97 per cent. There was a decided decline in the rate in the next ten years in the whole country, and low-priced cotton was responsible for the rate in the South being smaller than that in the rest of the country. In the next nine years, however, with improved conditions, the expenditures in the South more than doubled, while they increased at the rate of 82 per cent. in the rest of the country, and in the thirty years the increase in the South was at the rate of 483 per cent. compared with the rate of 400 per cent. in the rest of the country. The expenditures in the South last year were equal to the expenditures by the whole country in 1880, if not greater, and those expenditures were made in 1911 by a population in the South numbering 17,356,000 less than the population of the United States in 1880.

The Manufacturers Record



THE MANUFACTURERS RECORD, as a part of the *Journal of Commerce*, a commercial paper of high standing, came into existence in February, 1882, under the name of the *Journal of Commerce and Manufacturers Record*.

In November, 1882, it became a separate entity under its present editor, who had been with the *Journal of Commerce* for some years, and who had helped to give birth to the plan for an industrial publication. It dates its birthday as of February, making it at the present time thirty years of age.

It was established, as stated at the time, for the express purpose of giving its entire attention to the industrial interests of the South. From that day to the present it has never swerved from that policy. Without fear or favor it has always pursued the course which, according to the best judgment of its management, would produce the best results for the well-rounded growth and upbuilding of the whole South. It has often advocated policies which at the time have been unpopular with some of its readers. Had its views been in agreement at all times with all its readers, it would have been convinced that it was dead, and the conviction would have been pretty close to the edge of fact.

In special articles or in editorials its policy was quickly unfolded. Its earliest issues freely discussed such subjects as iron-making in the South, silk culture, openings for sales of machinery, fields for export of manufactured goods, enlargement of the textile industry, opportunities for foreign capital in the South, cottonseed-oil crushing, iron ores and trans-Atlantic steamship lines. As iron plants were built, marble quarries opened, the area of phosphate deposits widened, the lumber industry expanded, discoveries of petroleum made and railroad systems improved and extended, every turn in the development was encouraged and chronicled by the MANUFACTURERS RECORD, and all subjects dealing with the economic life of the South and with its general welfare have been discussed again and again with the sole aim of contributing to the best results on all lines for the South. Its forecast, as timely today as when first published, was given in the following words:

"Here are almost limitless forests of virgin timber of many varieties, boundless mineral wealth that has been hardly touched as yet, magnificent farming land that under proper cultivation would yield big returns, and a climate that can nowhere be surpassed. Possessing these advantages, the South is destined to be one of the richest countries upon which the sun ever shone. It has barely entered upon the threshold of the glorious future that awaits it.

"There must be a united earnest effort to attract the world's attention to the South's matchless resources, and then there must be a warm and hearty welcome to immigrants and to capital, not simply by Southern people individually, but by the States themselves. Investors seeking openings at the South for business, whether in industrial enterprises, banking, lending money or merchandising, ought to find no unnecessary laws or obstructions or unjust impositions in their way, and immigrants seeking homes should find a ready welcome and every effort be made to assist them in making homes."

To make known to the world the facts about these vast resources in timber, in minerals and soil, to quicken the interest of the people of the South in the limitless possibilities of their coun-

try, to impress upon capitalists in the South and West, as well as in Europe, the potentialities of the South, to encourage legislation which would guarantee protection to capital, whether it be capital of brains or brawn or money, to attract population from other sections to this favored land, has been a part of the work of the MANUFACTURERS RECORD. It has sought to make good its own forecast and to follow the policy which at the beginning it laid down for its own guidance. At times the business outlook in the South was dark and the clouds were heavy. Especially was this true in the early years following 1880, and again during the ten years of starvation prices for cotton from 1891 to 1900 and general stagnation throughout the country during a large part of that period. But the MANUFACTURERS RECORD knew that there was a golden lining behind the clouds, and that some day it would be seen. It knew that in due time poverty would give way to prosperity. It never lost faith in the outcome, and never doubted that the South's rich resources would ultimately command the world's attention.

The MANUFACTURERS RECORD has always asserted its right to speak according to its convictions in the interest of the South, and has contended for the right of others to disregard passing sentiment or temporary advantage in laboring toward a common end, the permanent, substantial progress of the Southern people. Business has always been placed by it before politics, and it has viewed as the best politics the politics, by whatever name it may be called, that works for the material good of the South.

This independence has been largely responsible for the fact that practically every man in the United States or abroad, whose observations or suggestions about the South have been worth publishing, has been numbered among the contributors to the MANUFACTURERS RECORD. The results of this publicity in which so many specialists and leaders in finance, transportation, engineering and general development work have willingly co-operated are manifest in the remarkable progress now underway in the South with constantly accelerated speed.

At the time when the MANUFACTURERS RECORD came into existence poverty and pessimism hovered like a great pall over the South. Here and there were rays of light breaking through the clouds. Here and there men of undaunted courage rallied to the fight those about them, and sought to rebuild on the wreck and ruin left when the thin shell of the long gray line, which stretched from Virginia to Texas in what was indeed a "far-flung battle line," had crumbled into dust. In the records of history probably no case similar to that of the South after 1865 can be found. For four years it had stood the shock of contending armies, and had so completely given its life blood to the struggle that though before 1860 it had been one of the fairest and richest lands of earth, it was aptly described by a Northern general when he said that a crow flying across that region would have to carry its rations with it.

Instead of the poverty and pessimism which then prevailed, brightened only here and there by a ray of sunshine breaking through the clouds, there now reigns throughout the South prosperity and optimism.

Poverty and pessimism then; opulence and optimism today. Dark as was the cloud then; bright is the sunshine today. Deep as was the poverty and woe then, abounding is the wealth and opportunity of the present.

That the MANUFACTURERS RECORD has been identified with the South through all this change, that it has ceaselessly proclaimed the South's resources, that it has favored what it believed to be for the South's good and fought what it believed would injure this section, that it has marked from week to week every step of progress made, every new industry established, every new break in the cloud, every new evidence of wealth accumulated, is its chief boast. If through its unceasing telling of the story of the South's resources it has been a factor in changing poverty and pessimism to opulence and optimism, and if it has been instrumental in helping to shape the destiny of this section along right lines and right thinking, and of assisting in eliminating throughout the country the bitterness of the war by proclaiming that "the development of the South means the enrichment of the nation," then its work has not been in vain.

To the Men of Vision Who Kept the South From Perishing


"Where there is no vision the people perish."—Proverbs, 29:18.

He who has the vision sees more than you or I;
He who lives the golden dream lives fourfold thereby;
Time may scoff and worlds may laugh, hosts assail his thought,
But the visionary came ere the builders wrought;
Ere the tower bestrode the dome, ere the dome the arch,
He, the dreamer of the dream, saw the vision march!

He who has the vision hears more than you may hear,
Unseen lips from unseen worlds are bent unto his ear,
From the hills beyond the clouds messages are borne,
Drifting on the dews of dream to his heart of morn;
Time awaits and ages stay till he wakes and shows
Glimpses of the larger life that his vision knows!

He who has the vision feels more than you may feel,
Joy beyond the narrow joy in whose realm we reel—
For he knows the stars are glad, dawn and mideday,
In the jocund tide that sweeps dark and dusk away.
He who has the vision lives round and all complete,
And through him alone we draw dews from combs of sweet.

—From "The Man with the Vision," by the Bentztown Bard.

 Miss Glasgow's thrilling story, "The Battleground," the weary Confederate soldier, broken in spirit, ragged and foot-sore, returning to the spot where once had stood his splendid home, which for years had been the scene of joy and mirth, was welcomed back by Betty with the cheering words, "We will begin again, my dear." Through the long struggle she had doubtless endured greater suffering than he had; yet, with never-faltering faith and courage, she breathed into him the breath of new life and new courage. She gave strength to face the wreck and ruin of war, of poverty, of a disorganized labor system, of misgovernment and wretchedness everywhere. Betty was a type of the women whose unswerving courage during the trying days of 1861 to 1865 had made possible the maintenance of that struggle against overwhelming odds.

The men who had endured the long, weary years of fighting, of privation, with death in every household, with poverty as universal as the air they breathed, caught Betty's vision of what the South could do in beginning again and re-establishing government, in bringing order out of chaos, prosperity out of gaunt misery.

These men of vision, without whose guiding power the South would, indeed, have perished, achieved greater marvels after 1865 than those of the battlefields on which they had led their troops to victory.

The fight against poverty, against lawlessness, against disorganization in legislation and in every avenue of governmental and business activity was a harder fight than that of bayonet and bullet and the roar of cannon through which they had just passed. This industrial fight required as much courage, as much ability, as that displayed by the same men in facing the cannon, or leading a charge on some apparently forlorn hope.

The material upbuilding of the South, which, by reason of the terrible disasters of the war made but little progress prior to 1880, was to a large extent led by men who had been active factors in that struggle. They were men of heroic mould; men of dauntless courage; men who knew not how to yield to defeat; in fact, they never recognized defeat. From one end of the South to the other they beat their swords into ploughshares, and preached and practiced the gospel of industrial development as the only salvation of the South.

With never-flagging zeal these men threw their very lives into the redemption of the South from poverty to prosperity. Their's was an up-hill fight; the odds were all against them. The world at large did not believe that they could re-establish a stable government, rebuild the South's fortunes and save this section to Anglo-Saxon civilization.

Living in the sunshine of today's prosperity, the people of the South may well pause to consider the achievements of the leaders in State government reorganization, in industrial development, in railroad building, in diversified agriculture, who, a third of a century ago, in every part of the South, did a work which has never been surpassed, if equaled, since. Some of the old industrial plants which had survived the ruin of war were revived; some new ones were built, and gradually there came a quickening, life-giving

realization that what the South had lost of wealth by the war could be more than regained through the fullest utilization of the natural resources with which a benign Providence had with a lavish hand endowed this region. These men took up the work which had been so ruthlessly destroyed by war. They sought to revive the industrial spirit of the South, rather than to create a new spirit, for there was inherent in Southern life a great latent power for engineering and industrial operations. In the early days, years before slavery had so fixed its chains upon the South as to temporarily enslave the white man's power, DeBow and many others had heralded from the housetop the manufacturing potentialities of this section; they had told of its vast resources in coal, and iron, and water-powers; they had laid the plans for great railroad construction; they had mapped the wealth-creating opportunities of the South and catalogued its long and varied list of mineral resources. Under their work this spirit, which had to some extent been dormant for 30 or 40 years, was being re-awakened, and between 1850 and 1860 its power was felt throughout the South. These men had done their work well. What the South undertook to do after the war was but to revive the latent industrial forces of the earlier days, which had been held in subjection or suppression by the enslaving influence of the concentration of thought and energy and capital upon slave-raised cotton, sugar and rice, because of the vast profits that these products yielded in those times of high prices.

But in those olden days the South wrought marvelous things, even though for 30 or 40 years its industrial activities were lessened by reason of the concentration of the energy of the South in cotton-raising. In the first half of the last century the South created a cotton industry which largely influenced the politics of the world and dominated the financial interests of this and other lands. This was without doubt the greatest business achievement of that half century in this or in other lands. The South's cotton-growing interests then represented far more capital than the aggregate investment in all the manufacturing plants of the United States. The development of so vast an industry had required as much brain power, as much energy, as much financial ability as had been displayed in the creation of the manufacturing interests of New England and the Middle States. In the antebellum period, moreover, the South had developed a well-rounded diversified agriculture by which this section was more largely self-sustaining than it has been since, its production of foodstuffs, in proportion to population, having been larger in 1860 than we have attained to since the war, notwithstanding the progress of recent years. In the decade between 1850 and 1860 there was a marked revival of the industrial and engineering spirit of earlier days. The South at that time was taking up with vigor the establishment of manufactures, the opening of coal mines and the building of railroads.

After 1865 the men who led the South in the direction of the promised land were men who had a vision. They looked into the earth and saw its limitless resources in coal and iron and copper and granites and marbles. They looked upon the soil and realized that though this land could produce all the varied crops of the widest agricultural diversity, it also had a practical monopoly of the world's most kingly staple—cotton. They looked upon its mountain streams and rivers running their courses idly to the sea, and saw that here was a power, the utilization of which could be made to run vast industrial activities and bring forth almost limitless wealth. They looked upon the sky bending above them, and realized that to this land Heaven had sent its softest and sweetest air. They realized that in its climatic advantages the South had an asset which could yet be made to crowd its matchless mountain regions, its long stretch of sea-coast and its Piedmont sections with millions of settlers seeking to escape the harshness of climate of less favored lands. With a clear vision of the future they could see that, by reason of these Heaven-given advantages, the time would come when throughout the South there would be seen a mighty army of health and pleasure-seekers from other sections upon which nature had not smiled as she had upon this.

With the vision of seers standing on some high mountain peak and surveying this vast, richly-endowed region, these men could see unrolling before them the panorama of ever-increasing industrial activity; of railroads threading the mountain passes; of running streams whose powers, if utilized in cotton mills and other industries, would give employment to millions of hands; of villages and towns becoming great centers of population and wealth; and


of increasing prosperity in all agricultural activities. With this power of vision, enabling them to draw aside the curtain that from others veils the mysteries of the future, they could with the assurance of knowledge urge with unceasing energy the utilization of these resources, the development of this imperial domain, that its people perish not.

What a long list of names comes trooping back as one thinks of the men who 25 to 30 years ago were leaders in this development. Among them were such men as Courtenay, the Pelzers, Tompkins, Bush, Gordon, Wilder, Burke, Seddon, Ensley, the Holts, the Caldwelles, Jordan, Alexander, Kimball, Huntington, Killebrew, DeBardleben, Sloss, Dawson, Noble, Belo, Randall, Pace, Bryan, Thomas, Buford, Exall, Avery, Howell, Grady, Hester, Shepper-son, Williams, Hotchkiss, Walters, Rosser, Lowry, Hanson, Flagler, Plant and a mighty host of others. Many of these men have long since passed to their reward, but their works shall live forever.

These were men of vision. Because they had a vision and were faithful to it they preached the gospel of progress with an abiding faith in its truth and in the final fulfillment of the eternal promises written by the hand of the Almighty in the everlasting hills bursting with mineral wealth, in the soil, in the climate and upon the very Heavens arched above us. They were leaders born for a purpose. They had a work to do; they did it with marvelous success. All that the South is reaping today is but the harvesting of the seed they sowed amid discouragements of which the present generation knows nothing.

"Pig-Iron" Kelley's Prophecy

"The Development of the South Means the Enrichment of the Nation."

 WENTY-FIVE years ago, Hon. William D. Kelley, who was then known as the Father of the House of Representatives and sometimes familiarly called "Pig-Iron" Kelley by reason of his devotion to a protection on iron, made a careful study of the South and wrote for the MANUFACTURERS RECORD a series of articles outlining the vast industrial and agricultural possibilities of this section. Judge Kelley's recognition of the situation of the South at that time in its relation to the whole country was expressed in a personal letter to the Editor of the MANUFACTURERS RECORD, giving his reasons for writing these articles, in which he said "The development of the South means the enrichment of the nation."

Taking this as its motto, the MANUFACTURERS RECORD has ever since emphasized the great fact that the development of the South means the enrichment of the nation.

Judge Kelley's idea was broader than that merely of material upbuilding. He believed that there could be no well-rounded national growth, no broad development of national spirit, so long as the South continued in dire poverty as a result of the war, while the rest of the country was marvelously expanding in industry and agriculture and commerce. With this as its motto the MANUFACTURERS RECORD has labored unceasingly in the spirit in which it was founded thirty years ago for the upbuilding of the South.

It is through Southern development that the broadest national prosperity alone can come.

It is through the utilization of the vast resources of the South, which make this section really the nation's greatest asset, that the highest development of business in other sections can be brought about.

Only through the broadest expansion of the industrial and agricultural and commercial interests of the South is to be found scope for the energy and activities and capital of other sections.

Through the advancement of the agricultural and industrial interests of the South the nation's international trade relations alone can be maintained.

Through the enormous exports of Southern cotton, bringing to the South \$500,000,000 or more a year, the financial strength of the country is made possible.

The predestined center of industrial activity and wealth-creation, of commerce with Central America and the Orient, as well as with Europe, with less inter-mixture of foreign blood than any other part of the country, the stronghold of the so-called Anglo-

Saxon civilization of the world, unmarred as yet by the portentous evils which are threatening government and business alike in many other parts of the country, the South is to be the bulwark of national safety and the leader in national industrial progress.

Truly it was with a prophetic mind and the vision of a seer that Judge Kelley more than a quarter of a century ago wrote for the MANUFACTURERS RECORD its motto:

"The development of the South means the enrichment of the nation."

The South: Past, Present and Future

Its Material Development Only a Beginning of Its Achievements



WE must learn to think in billions rather than in millions if we would so broaden our mental horizon as to be able to see with some degree of clearness the possibilities of material development in the South. Then, too, we must get the right perspective for a survey of the situation. It is not enough to say that the South has vast stores of coal and iron and other minerals; that it produces nearly three-fourths of the world's cotton; that it has vast water-powers awaiting development. It is not enough to know the mere statistics that tell of the South's resources or measure its supply of raw material; nor is it enough to know those that illuminate its achievements during the last thirty years. These facts, though important, are not sufficient to enable us to forecast the future of the South unless they be studied in connection with other things. If we would know how much wealth may be created out of the utilization of coal and iron ore in the South it is necessary to have some knowledge of the extent of the coal and the iron ore of this section as compared with other sections or other countries, and likewise some knowledge of the wealth produced by coal and iron ore elsewhere. We cannot understand the value of our cotton and the possibilities in cotton manufacturing unless we know the importance of cotton in the world's industrial and financial affairs.

It is also essential in a study of this kind to understand something of the South prior to 1860 and the changed economic conditions which came about throughout the world a half century ago by reason of which other sections of the United States made amazing industrial progress, while the South in reality stood still. Indeed, it may be seriously questioned if the South did not go backwards for nearly a quarter of a century after the war. Statistics of production in manufactures and in agriculture and of railroad mileage showed a large increase. But there are other factors which should be taken into account in order to estimate accurately the South's progress. If ten years ago it had been possible to create a true balance sheet, putting against the enlarged production as it appeared on the profit side the stupendous losses which ought to have been charged on the other side of the ledger, it is quite probable that the net result would have shown that there was little or no real increase in the South's true wealth up to that time. Its really amazing progress has been made since then. On the debit side we should have had to place the loss of 2,500,000 Southern-born whites who between 1865 and 1900 emigrated from the South to other sections. In so far as the Central South is concerned, we should have had to add to that a million or more who went out to Texas and the Southwest. At the lowest calculation this emigration of 2,500,000 people entirely beyond the borders of the South, due to the impoverished conditions following the war, was an economic loss of \$4,000,000,000 or \$5,000,000,000, for in material upbuilding men count for more than coal and iron and cotton. Another item to be charged to the debit side would have been the vast destruction of timber, much of it sold at a very small price, almost given away in fact, leaving but little profit to the South; and likewise the enormous waste of soil by the shiftless, thriftless methods of tenant farming which followed the war as one of its curses.

In preparing a true balance sheet of the South in 1900 these enormous losses, greater by far than the actual destruction by war, should be taken into account against the gains made in the actual increase in agriculture and manufactures and railroad mileage.

Comparatively few people seem to know much about the South of ante-bellum days. The inherent strength and virility of the people of the South and the natural resources of this section are therefore not understood. Even Southern colleges and universities have fallen short of their high responsibilities to the extent that they have failed to impress upon their students the most striking business achievements of the people of the old South. Credit is given to the old South for its statesmen and its warriors, for its broad vision in national affairs, for its influence in shaping our government and in enlarging our territory, but if the question were asked, what was the greatest business achievement of the first half of the nineteenth century, how many would answer that it was the creation by the South of a cotton industry which represented more invested capital than the aggregate capital of all the manufacturing interests of the United States in 1850? Even then the South's cotton dominated the foreign commerce of the United States and shaped much of the business and political activities of Europe as well as of America. The creation of this industry required as much business ability as that needed for the development of the manufacturing interests of the country, and it involved much more capital.

In 1860 the assessed value of property in the Southern States was greater by nearly \$1,017,000,000 than the assessed value of property in the Middle

and New England States combined. Between 1850 and 1860 the total value of Southern property increased over \$3,843,000,000 against the increase during the same period in New England and the Middle States of \$2,460,000,000. Thus in that period the South showed a gain in wealth greater by \$1,383,000,000 than the united gain of the New England and Middle States. In 1860 45 per cent. of the assessed value of property in the United States was in the South. While the assessed value of Southern property exceeded by \$1,017,000,000 the assessed value of property in the New England and Middle States in 1860, the change in the war decade between 1860 and 1870 was so stupendous that in the latter year the assessed value of property in the New England and Middle States exceeded that of the South by \$10,244,000,000. Much of this enormous advance in wealth in the North was due to the industrial era which was developing during that period, stimulated in part as it was by the war.

In 1860 the world was awakening to a conception of the wealth-creating influence of the steam engine and power machinery. The South long before that year had caught a vision of the vast changes to follow railroad building and the modern improvements typified by the locomotive. In the South at that time industrial development was being pushed with much energy. During the decade, 1850 to 1860, nearly every line of manufacturing in the South showed a larger percentage of increase than in the rest of the country. These percentages, of course, were based on smaller totals, yet they were indicative of the reawakened spirit of industrialism which had to some extent been dormant since the invention of the cotton gin had helped to fasten slavery and cotton upon the South. Prior to that invention the South was leading in industrial activities. Its people were much given to manufacturing pursuits, to engineering work, and its pioneer iron-makers were found throughout the mountain regions of Virginia, the Carolinas, Georgia and Tennessee. Of these pioneers, Swank in his "History of Iron in All Ages" said they seemed to have been born with a genius for iron-making. The renewed activity in manufacturing interests and the rapid expansion of railroad building between 1850 and 1860 was merely a revival of a latent spirit in the South. The material advancement during the last thirty years is largely due to the reawakening or new birth of that industrial spirit which had been almost crushed to death by the war.

Though the South of 1860 was giving great attention to railroad building and to the development of its manufactures, with many of its leaders persistently proclaiming its vast stores of coal and iron ore, its water-powers and its manufacturing facilities, its agricultural prosperity could scarcely be called less than marvelous. In that year the South produced 52 per cent. of the total corn crop of the country, the entire rice and sugar crops, the bulk of the tobacco raised, and nearly all of the sweet potatoes. These States had 47 per cent. of the total value of live stock and 42 per cent. in value of all the agricultural implements in the country. They had a well-rounded diversity of agricultural interests in addition to their production of the entire cotton crop.

These facts are mentioned in order that the inherent strength of character of the people of the old South in agricultural, industrial and railroad pursuits may be understood, and likewise that the wealth of the South, based on the utilization of its natural resources, may be appreciated. It is because these facts are not generally known that the old South is accused of lack of energy and enterprise, and even now its people are sometimes charged with having been inferior to those of other sections in business ability, in energy and enterprise in the development of their country and in the creation of wealth. These facts are given to emphasize two things:

1. The inherent business ability and energy of the people of the old South; and,
2. The South's natural resources which enabled this section to so far outstrip the New England and the Middle States in the accumulation of wealth.

These two points are to be remembered in considering the South's future, for they show what has been done as illustrating what will be done.

The South of today with its thrill of industrial, railroad and agricultural activity is but a revival of the old South. The commercial and industrial spirit which found expression in the broad business activity of antebellum days, temporarily crushed by the war and the results following it, is again seen triumphant in the development of every line of industry to which this section was bending its energy prior to 1860.

About 1880 the South commenced to show signs of industrial revival. In the next ten years it made very considerable progress. It shared in the benefit as well as in the losses which resulted from the world-wide real estate and town lot speculative fever of 1885 to 1892. That fever raged in the West and on the Pacific Coast, in Canada and in South America more violently than in the South. It stimulated the people of the South into a speculative activity, which, though it resulted in some good, left many wrecks behind when the general collapse came about in 1892. Unfortunately for the South there followed, though having little direct connection with it, a serious decline in the price of its chief staple—cotton. From 1891 to 1900 cotton sold at so low a price that it is questionable whether the South at large in that whole period made a dollar on its cotton production. In fact, if the deterioration of its soil at that time be taken into account, it is altogether probable that the South in that ten-year period lost heavily through the raising of cotton. It was a time of great agricultural depression, and so far as the South was concerned of general business stagnation until 1896.

About ten years ago there came a marked improvement in the cotton situation. Low prices were followed by steadily advancing figures. For the last five or six years this crop has averaged about \$700,000,000 or \$800,000,000 a year against \$300,000,000 to \$400,000,000 for the decade ending with 1900. The crop of 1910 was worth to the farmers of the South over \$1,000,000,000, or more than twice as much as the total gold output of the world for the same period.

Cotton is a priceless heritage. In controlling the production of about 75 per cent. of the world's cotton yield the South holds a dominating position in the financial and business affairs of this country and Europe. There are 130,-

000,000 cotton spindles in the world, and the South furnishes about three-fourths of the raw material to keep them running. Great as has been its own advancement in cotton manufacturing, it has yet only a little more than 11,000,000 spindles.

Much of New England's great wealth is based on the manufacture of Southern raised cotton. It has hundreds of millions of dollars invested in cotton mills and in the manufacture of textile machinery. The development of the cotton industry has drawn into New England many thousands of foreigners, as it will eventually do in the South. The time is not far distant when the supply of native labor in the South will not equal the demand. There will then come, slowly, perchance, at first, but in ever-swelling numbers, a movement of foreign population into Southern mill centers.

What cotton has been to New England, so has it been to old England. The vast wealth of that country has to a very large extent been created out of cotton. To its great cotton industry, giving employment to more than a billion of capital and millions of people, it has also added the wealth made out of coal and iron. Without these three interests it would never have been possible for Great Britain to have won its way to its dominating power in the commerce and finance of the world. Coal and iron are largely responsible for the wealth of Germany and the wealth of Ohio, Pennsylvania and Illinois. They have been the foundation on which has been raised the vast industrial structure of these countries. The strength of the South's position in the metallurgical world is in some respects almost akin to its strength in the cotton world, though it has not, of course, so dominating a position. For instance, while Great Britain, Germany, France and Austria combined have 17,000 square miles of coal area, the South has 99,166 square miles. There is scarcely any limit to which the coal and coke development of the South can be carried. About 75 per cent. of the coking coal supply of the United States is in the South, and coking coal as a factor in producing the enormous wealth of Pennsylvania has been as important as Lake Superior iron ore. In connection with this enormous coal supply, to which should be added 84,300 square miles of lignite, this section has iron ore resources sufficient to justify the development of an iron and steel industry surpassing that of the United States at present. The South, moreover, has been as richly endowed with other things as with coal and cotton and ore. It has its phosphate rock, the basis of the world's fertilizer industry; its sulphur, of which it produces about one-half of the world's output, dominating the sulphur trade of the whole world; its oil and gas; its granites and marbles; its copper; its clays, and other wealth-creating resources of almost unlimited extent. It is already producing more than 1,000,000,000 bushels of grain per year, and Secretary Knox of the State Department predicts in this issue that it will become the chief corn producing section of the country. With intensive cultivation, which is becoming the order of the day, it could double its output of grain and cotton without the increase by a single acre of the land under cultivation. The South can beat California in citrus fruit raising, and Oregon and Washington in apple growing. Even now the value of the agricultural output of the South is greater than the total value of the farm products of the United States in 1890. In that year the farm crops of the whole country yielded a total of \$2,460,000,000. In 1911 the total value of the agricultural output of the South was about \$3,000,000,000.

We are on the eve of a vast industrial expansion in the South, of a hundred million dollars or more being expended in hydro-electric development, of great electric interurban railroad building, of the truly wonderful progress in the utilization of hitherto waste products, of a heavy Southward movement of population from the North and West, and to an ever-increasing extent from Europe. Commerce from Southern ports is rapidly expanding. The value of foreign exports from one Southern port last year exceeded by \$25,000,000 the value of the combined foreign exports from every United States port on the Pacific Coast.

More than 50 years ago Commodore Maury, the "Pathfinder of the Seas," in a brilliant report on the importance of the Isthmian Canal, stated that when the barrier which separated the Atlantic and the Pacific oceans had been broken down by the cutting of a canal, the commerce of the world would center in the Gulf of Mexico. The signs of the times show that the railroad kings and the financial giants of America are realizing that this prediction is to be fulfilled. There is scarcely a great railroad system in the country not now in the South that is not striving to secure strategic connections with South Atlantic and Gulf ports all the way from Maryland to Texas, while Southern railroads are rapidly increasing their facilities at all leading ports for handling rapidly growing traffic.

It is almost commonplace to say that the resources in soil, minerals, climate and water-powers, added to its geographical location, are sufficient to enable the South to create far greater wealth than that of the United States at present, to support in comfort a far greater population than that of the entire country, and to produce in agriculture and in manufactures a larger output than that of the United States today. These things are now becoming so well understood that it seems hardly necessary to mention them. Having struggled through the weary forty-year journey in the Wilderness of Poverty, the South has emerged into sight of the Promised Land of Abounding Prosperity. The resources of this section are so great, so varied, that henceforth their development will offer to the people of the South, as well as to the thousands of other regions whose faces are already turning this way, opportunities for profitable development of great business interests, for prosperity in agriculture, for city building activities, such as were never found in any other part of our country.

Though this statement may to those not acquainted with the situation seem over-enthusiastic, it merely voices the firm belief of many of the foremost men in public life, students of economic conditions and business men of international prominence.

Cotton Crop of the South Greater in Value Annually Than the World's Gold and Silver Output.

In the past 32 years the value of the South's cotton crops, including seed, has aggregated \$15,514,000,000.

In the same period the world has produced \$7,172,378,300 of gold, and \$3,340,271,542 of silver.

The aggregate for these 32 cotton crops exceeded by \$8,341,621,700 the output of the gold mines of the world, and by \$5,001,350,158 the combined values of the output of the gold and silver mines of the world for the same period.

All the gold mines of the world have produced in no year since 1880 to a value sufficient to pay for that year's Southern cotton crop, including seed. Indeed, the annual output of the world's gold mines has seldom been large enough to pay for the raw cotton exported from the South in that year.

If Europe had last year been able to gather every ounce of gold mined in the world and shipped it to the South, it would have fallen \$122,700,000 short of paying the South's bill against Europe for the cotton it bought that year.

Southern cotton fields surpass as sources of wealth the gold and silver mines of the world. Mines can be exhausted. The virtual monopoly of the South in cotton production may be maintained indefinitely, and the volume of the South's exports of cotton ought to annually increase more rapidly than there is any promise of the world's gold production increasing.

In the 32 years under review the United States have exported merchandise to an aggregate value of \$36,947,505,688 and of that total

Values of Cotton and of Gold and Silver Compared.

Year Ended August 31,	Cotton Crop, with Seed, Value.	Year Ended Dec. 31,	Gold Produced, Value.	Silver Produced, Bullion Value.
1879-1880	\$325,000,000	1879	\$108,778,800	\$83,601,097
1880-1881	370,000,000	1880	106,436,800	85,645,823
1881-1882	320,000,000	1881	103,023,100	89,474,543
1882-1883	342,000,000	1882	101,996,600	98,189,536
1883-1884	300,000,000	1883	95,392,000	98,871,915
1884-1885	295,000,000	1884	101,729,600	90,595,725
1885-1886	331,000,000	1885	108,435,600	97,573,767
1886-1887	315,000,000	1886	106,163,900	92,800,015
1887-1888	360,000,000	1887	105,774,900	94,149,207
1888-1889	382,000,000	1888	110,196,900	102,269,654
1889-1890	411,000,000	1889	123,489,200	112,412,950
1890-1891	486,000,000	1890	118,848,700	121,938,307
1891-1892	446,000,000	1891	130,650,000	135,524,865
1892-1893	321,000,000	1892	146,651,500	133,464,103
1893-1894	331,000,000	1893	157,494,800	129,118,286
1894-1895	326,000,000	1894	181,175,600	104,493,132
1895-1896	330,000,000	1895	198,763,600	109,751,896
1896-1897	371,000,000	1896	202,251,600	106,118,515
1897-1898	382,000,000	1897	236,073,700	97,027,483
1898-1899	320,000,000	1898	286,879,700	99,759,505
1899-1900	416,000,000	1899	306,724,100	101,261,711
1900-1901	573,000,000	1900	254,576,300	107,638,797
1901-1902	496,000,000	1901	260,992,900	103,106,164
1902-1903	561,000,000	1902	296,737,600	85,930,981
1903-1904	702,000,000	1903	327,702,200	90,983,195
1904-1905	719,000,000	1904	347,377,200	95,029,652
1905-1906	716,000,000	1905	380,288,700	103,609,456
1906-1907	799,000,000	1906	402,503,000	111,723,739
1907-1908	759,000,000	1907	412,966,600	121,856,604
1908-1909	776,000,000	1908	443,006,200	108,711,397
1909-1910	903,000,000	1909	454,422,900	109,865,919
1910-1911	1,030,000,000	1910	454,874,000	117,773,603
Total \$15,514,000,000			\$7,172,378,300	\$3,340,271,542

Value of the South's cotton crops, including seed, in 32 years.....		\$15,514,000,000
Value of the world's production of gold and silver in 32 years.....		\$10,512,649,842
Excess of cotton value over gold and silver value in 32 years.....		\$5,001,350,158

Values of Raw Cotton Exports and of Gold Production.

Year Ended August 31,	Raw Cotton Exports.	Year Ended December 31,	Gold Value.
1879-1880	\$209,852,005	1879	\$108,778,800
1880-1881	245,534,539	1880	106,436,800
1881-1882	191,414,348	1881	103,023,100
1882-1883	245,666,440	1882	101,996,600
1883-1884	195,854,531	1883	95,392,000
1884-1885	200,279,823	1884	101,729,600
1885-1886	203,909,617	1885	108,435,600
1886-1887	204,740,804	1886	106,163,900
1887-1888	222,805,494	1887	105,774,900
1888-1889	235,898,233	1888	110,196,900
1889-1890	250,569,334	1889	123,489,200
1890-1891	291,499,029	1890	118,848,700
1891-1892	258,628,371	1891	130,650,000
1892-1893	190,787,234	1892	146,651,500
1893-1894	208,168,419	1893	157,494,800
1894-1895	200,747,308	1894	181,175,600
1895-1896	194,996,401	1895	198,763,600
1896-1897	227,881,785	1896	202,251,600
1897-1898	232,827,730	1897	236,073,700
1898-1899	212,107,591	1898	286,879,700
1899-1900	245,652,268	1899	306,724,100
1900-1901	318,262,883	1900	254,576,300
1901-1902	285,492,983	1901	260,992,900
1902-1903	310,879,792	1902	296,737,600
1903-1904	375,391,318	1903	327,702,200
1904-1905	403,121,992	1904	347,377,200
1905-1906	385,159,047	1905	380,288,700
1906-1907	472,088,260	1906	402,503,000
1907-1908	443,407,637	1907	412,966,600
1908-1909	419,733,103	1908	443,006,200
1909-1910	460,710,176	1909	454,422,900
1910-1911	577,570,865	1910	454,874,000
Total \$9,121,639,360			\$7,172,378,300

Value of exports of the South's raw cotton in 32 years.....		\$9,121,639,360
Value of world's output of gold in 32 years.....		\$7,172,378,300
Excess of cotton exports value over gold output in 32 years.....		\$1,949,261,060

\$9,121,639,360, or 24.7 per cent., is the value of exports of raw cotton alone. That amount is \$1,949,261,060 greater than the value of the output of the gold mines of the world for the same time.

The raw cotton exported from the South between 1880 and 1911 brought from abroad in gold or credits more than \$9,000,000,000 to the United States.

The supreme importance of the South's cotton in the foreign trade of the country is strikingly illustrated in these figures. Practically one-fourth of the entire export trade of the United States for the last 32 years has consisted of the South's raw cotton.

Moreover, in a full estimate of the importance of cotton in relation to the nation's foreign trade must be considered some hundreds of millions of dollars worth of exports of cotton seed oil, meal and other derivatives now averaging between \$25,000,000 and \$30,000,000 annually, and of manufactured cotton exports now averaging between \$40,000,000 and \$50,000,000 annually.

The detailed exhibit of 32 years presents an illuminating comparison showing the world-wide importance of the South's cotton and its vital relation to the foreign trade of the United States.

In the maintenance of this practical monopoly of the world's cotton trade by the South, and in the maintenance of high prices, which bring back from Europe a flood of gold to fertilize every field of industry in America, the people of the North and the West are as vitally interested as those of the South.

Manufacturing has Overtaken and Passed Agricultural Production in the South

BETWEEN 1880 and 1890 production in manufacturing overtook and passed production in agriculture, and thus was marked out the industrial future of the South. This change of position had happened for the whole country before 1860, in which year the value of agricultural products in the United States was \$1,750,000,000 and the value of manufactured products \$1,885,862,000. In 1880 the South produced in agriculture to the value of \$756,000,000 and in manufacturing \$622,840,000. By 1890 the value of manufactured products in the South had risen to \$1,242,581,000, while the advance in the value of agricultural products had been to \$876,452,000. Of the aggregate value of production in the two lines in 1880, agriculture had 55 per cent., but by 1890 its proportion had fallen to 42 per cent., and it is now about 44 per cent. of the aggregate.

demand for cotton, had been suppressed for fifty years before 1850, while the rest of the country was rapidly availing itself of the facilities of the machinery age. Capital that elsewhere was almost compelled into manufacturing channels was in the South deemed to be better invested in plantation operations, and it was not until the forties, when low prices for raw cotton prevailed for a series of years, dropping from 13.36 cents per pound in 1839 to 5.63 cents in 1845, that persistent work was done in establishing factories of various kinds in the South and extending the machinery necessary for the success of manufacturing. Then came the war, emphasizing the weakness of the South in manufacturing, in spite of the notable advance it had made between 1850 and 1860. But out of the scrap-heap the industrial spirit revived, and long before ruined homes had been rebuilt the wheels of industry were

CAPITAL IN MANUFACTURING.

States.	*1880.	*1890.	*1900.	†1900.
Alabama	\$9,668,000	\$46,123,000	\$70,370,000	\$173,479,000
Arkansas	2,953,000	14,972,000	35,961,000	70,139,000
District of Columbia	5,553,000	28,865,000	41,981,000	30,553,000
Florida	3,211,000	11,110,000	33,107,000	65,128,000
Georgia	20,672,000	56,922,000	89,790,000	202,913,000
Kentucky	45,813,000	79,812,000	104,071,000	172,779,000
Louisiana	11,462,000	34,754,000	113,084,000	221,806,000
Maryland	58,742,000	119,667,000	163,147,000	251,237,000
Mississippi	4,728,000	14,897,000	35,807,000	72,393,000
Missouri	72,508,000	189,559,000	249,889,000	442,847,000
North Carolina	13,046,000	32,746,000	76,504,000	217,183,000
Oklahoma		300,000	5,976,000	38,873,000
South Carolina	11,206,000	29,276,000	67,356,000	173,221,000
Tennessee	20,093,000	51,475,000	71,814,000	167,924,000
Texas	9,246,000	46,815,000	90,434,000	216,876,000
Virginia	26,969,000	63,457,000	103,671,000	216,392,000
West Virginia	13,883,000	28,118,000	55,904,000	150,923,000
Total	\$329,753,000	\$848,868,000	\$1,408,866,000	\$2,884,666,000
United States	\$2,790,273,000	\$6,525,051,000	\$9,831,487,000	\$18,428,270,000

*Including hand trades and neighborhood industries. †Factories only, not including hand trades and neighborhood industries.

PRODUCTS OF MANUFACTURING.

States.	*1880.	*1890.	*1900.	†1900.
Alabama	\$13,566,000	\$51,227,000	\$80,741,000	\$146,431,000
Arkansas	6,756,000	22,659,000	45,198,000	74,818,000
District of Columbia	11,882,000	39,331,000	47,668,000	25,289,000
Florida	5,546,000	18,223,000	36,810,000	72,724,000
Georgia	36,441,000	68,917,000	106,655,000	202,641,000
Kentucky	75,483,000	126,720,000	154,166,000	223,754,000
Louisiana	24,205,000	57,807,000	121,182,000	223,928,000
Maryland	106,781,000	171,843,000	242,553,000	317,570,000
Mississippi	7,518,000	18,706,000	40,431,000	80,555,000
Missouri	165,386,000	324,562,000	385,493,000	572,085,000
North Carolina	20,095,000	40,375,000	94,920,000	216,614,000
Oklahoma		429,000	10,976,000	53,682,000
South Carolina	16,738,000	31,927,000	58,749,000	113,236,000
Tennessee	37,075,000	72,355,000	108,145,000	180,130,000
Texas	20,720,000	70,434,000	119,415,000	272,896,000
Virginia	51,781,000	88,364,000	132,173,000	219,794,000
West Virginia	22,867,000	38,702,000	74,838,000	161,960,000
Total	\$622,840,000	\$1,242,581,000	\$1,860,113,000	\$3,158,107,000
United States	\$5,369,579,000	\$9,372,379,000	\$13,010,037,000	\$20,672,052,000

*Including hand trades and neighborhood industries. †For factories only, not including hand trades and neighborhood industries.

Meanwhile, the value of Southern agricultural products has reached a sum at least \$500,000,000 greater than the value of agricultural products in the whole country in 1880, and the capital in Southern manufacturing is about \$600,000,000 greater than such capital in the country in the earlier year. In the whole period the rate of increase, both in capital invested in manufacturing and in the value of manufactured products, has been greater in the South than in the rest of the country. That the value of manufactured products in the South in 1911 was short by about \$1,500,000,000 of the value of such products in the whole country in 1880, is due to the greater diversification in manufacturing industry in the rest of the country, whereas a great part of the production in the South is of goods in iron, cotton and lumber that are not brought to their ultimate form in the South, but really constitute much of the material for specialized manufacturing in the rest of the country. Influential in this situation is the fact of the comparatively fallow state in which lay the resources for industry in the South in the twenty years between 1860 and 1880.

For, the intense energy turned into manufacturing in the early eighties was not an expression of a sudden awakening of the South to its opportunities in this particular. It was but a stirring of old instincts which eighty or ninety years earlier in the days of hand-trades had made the South equal to the rest of the country in industrial pursuits, but which, in effort to meet the world

revolving again here and there. As early as 1870 the reconstituted Tredegar Iron Works at Richmond were making all sorts of iron castings, using every year a certain amount of Scotch pig-iron and employing a thousand hands, and other foundries and machine shops in that city were manufacturing engines and agricultural implements. The cotton factory at Augusta, Ga., one of the few in the South that had not been destroyed by the war, was prospering in the production of sheetings, shirtings and other plain domestic fabrics; the Chattanooga Rolling Mills had been reorganized by General Wilder and his associates, who were calculating that they would be able to make iron rails and lay them down in Pittsburgh cheaper than they could be produced at that center; one of the three cotton factories near Florence, Ala., utterly destroyed by the war, had been rebuilt and was making some cloth, but principally yarn, sold to the nearby country people to be manufactured at home; the Mobile Cotton Oil Mills, representing an investment of nearly \$100,000, was buying cotton seed at from \$10 to \$12 a ton and deriving from it cotton oil, cake and material for fertilizer; a mill at Tuscaloosa had been able to manufacture paper from okra fiber, and New Orleans had an ice factory turning out 72 tons a day. The world-wide search for iron-ore, limestone and coal had begun, and the remarkable contiguity of these materials for iron-making in the South was beginning to be appreciated. Only four years later, after

personal inspection of the field, Sir Lothian Bell, the eminent English authority on iron-making, said:

"In the Southern States of Tennessee and Alabama, and to some extent in Georgia, there are very large deposits of iron-ore which lie so near to the coal fields of the valleys watered by the Alabama and Black Warrior Rivers as to render, in all likelihood, the cost of bringing together the materials for making iron not more than it is on the River Tees. The natural conditions under which ore and fuel are found are such that it would be difficult to find a locality of any magnitude in any country where these minerals can be more cheaply wrought than in Alabama. Ultimately, there seems nothing, so far as our present knowledge permits us to judge, to prevent these Southern States from becoming the cheapest iron-making centers in the Union."

Thus were reflected the strivings which in another ten years found the South flushed with enthusiasm for development on all lines, building railroads at the rate of 2000 miles a year, doubling the number of its spindles and looms in cotton mills in five years, establishing cottonseed oil mills at the rate of twenty a year, increasing its iron-ore production, coal mining and phosphate rock mining, carving into its forests and investing in one year in the States that had been included in the Confederacy more than \$40,000,000 in new enterprises. Characteristic of developments at that time were an increase between 1880 and 1885 of the value of manufactured products at Atlanta from \$5,000,000 to \$12,000,000, an increase in one year in the output of a company in the Pocahontas coal fields from 99,871 tons to 283,252 tons, plans made in one week for the building of four iron furnaces in Alabama, with talk of steel works for Birmingham; efforts to revive the sugar refining industry of Baltimore and the sale of a tract of 60,000 acres of timber land in North Carolina. Natural gas had been discovered in Alabama, and it was realized that there was plenty of petroleum in the South. In fourteen Southern States 1800 industries, small and great, were established in 1885.

With all this enthusiasm and all these patent evidences of progress, the men of faith in the South felt its limitations and urged greater exertions to overcome them. The South was dependent upon the North for goods that it could make to much better advantage; it was buying annually millions of cans

of 49.7 per cent., while the increase in the rest of the country of \$3,020,126,000 was equal to 37.1 per cent.

Of the \$9,831,487,000 total manufacturing capital in the country in 1900, something more than 91 per cent., or \$8,975,256,000 was in factories, and of the \$13,010,037,000 total value of manufactured products, 87.7 per cent., or \$11,406,927,000, represented the value of the products of factories alone. Between 1900 and 1909 the capital invested in factories in the South increased from \$1,196,302,000 to \$2,884,666,000, or by \$1,688,364,000, equal to 141.1 per cent., and in the rest of the country from \$7,778,954,000 to \$15,543,604,000, or by \$7,764,650,000, equal to 99.8 per cent., while the increase in the value of factory products in the nine years in the South was from \$1,564,184,000 to \$3,158,107,000, or by \$1,593,923,000, equal to 101.9 per cent., and in the rest of the country from \$9,842,743,000 to \$17,513,945,000, or by \$7,671,202,000, equal to 77.9 per cent. In this nine-year period the greater rate of increase, both in capital and in the value of products in the South, was in the first four years, being 66.6 per cent. between 1900 and 1904 as compared with 44.7 per cent. between 1904 and 1909 in capital, the actual increases being \$796,828,000 and \$891,536,000, respectively, and 43.9 per cent. between 1900 and 1904 as compared with 40.2 per cent. between 1904 and 1909 in the value of products, though the actual increases were \$687,799,000 and \$906,124,000, respectively.

For an estimate of the amount of capital in manufacturing in the South and the value of manufactured products in 1911 must be taken into consideration the fact that the \$1,196,302,000 of capital in factories in the South in 1900 represented but 84.9 per cent. of the manufacturing capital, and that the \$1,564,184,000 value of factory products in that year was but 84.1 per cent. of the value of manufactured products, manufacturing including hand-trades and neighborhood industries. Ten or eleven years probably made no material change in these proportions, and, therefore, with the hand-trades and neighborhood industries added, one may safely estimate the manufacturing capital of the South in 1911 at \$3,397,000,000 and the value of manufactured goods at \$3,800,000,000.

The rate of increase in the capital invested in Southern factories between 1900 and 1909 was almost up to the average annual rate of increase in manu-

MANUFACTURING INCREASE, 1880-1890.*

States.	Capital.		Products.	
	Amount.	P. C.	Amount.	P. C.
Alabama	\$36,455,000	377.	\$37,661,000	277.6
Arkansas	12,019,000	407.	15,903,000	238.3
District of Columbia ..	23,312,000	419.8	27,449,000	231.
Florida	7,899,000	246.	12,677,000	228.6
Georgia	36,250,000	175.3	32,476,000	89.1
Kentucky	33,999,000	74.2	51,237,000	67.9
Louisiana	23,292,000	203.2	33,602,000	138.8
Maryland	60,925,000	103.7	65,062,000	60.9
Mississippi	10,169,000	215.1	11,188,000	148.8
Missouri	117,051,000	161.4	159,176,000	96.3
North Carolina	19,700,000	151.	20,280,000	100.9
Oklahoma	300,000	.....	429,000	.....
South Carolina	18,070,000	161.2	15,189,000	92.5
Tennessee	31,382,000	156.1	35,280,000	95.1
Texas	37,569,000	406.3	49,714,000	239.9
Virginia	36,488,000	134.9	36,583,000	70.6
West Virginia	14,235,000	102.5	15,835,000	69.2
Total	\$519,115,000	157.4	\$619,741,000	99.5
United States	\$3,734,778,000	133.5	\$4,002,800,000	74.6

*Including hand trades and neighborhood industries.

of fruits and vegetables; it was shipping its pig-iron to the North at an expense of \$3 or \$4 for freight and buying it back in the shape of agricultural implements, stoves, machinery, hardware and other articles, and, notwithstanding its magnificent resources of timber, was sending to the North and West for its furniture. The call was for diversified agriculture and diversified manufactures built upon small factories well located and well managed.

Answer has begun to be made in the fact of \$3,397,000,000 invested in manufacturing in the South, turning out annually goods to the value of \$3,800,000,000. Of 339 separate kinds of industries covered by the 1905 census, 262 are represented in the South. The story of the progress since 1880 is impressive, even in its statistical sketch form. For clearness in studying the figures it must be borne in mind that those of the censuses of manufactures of 1880, 1890 and 1900 include hand-trades and neighborhood industries, which subsequent censuses have not considered in dealing with factories.

Capital in manufacturing increased between 1880 and 1890 from \$329,753,000 to \$848,868,000, or by \$519,115,000, equal to 157.4 per cent. in the South, and from \$2,460,520,000 to \$5,676,183,000, or by \$3,215,663,000, equal to 130.7 per cent. in the rest of the country. In the next ten years the increase in the South was by \$559,998,000, or at the rate of 65.9 per cent., and in the rest of the country by \$2,746,438,000, or at the rate of 48.4 per cent. In the 20 years the capital in the South increased from \$329,753,000 to \$1,408,866,000, or by \$1,079,113,000, equal to 327.2 per cent., and in the rest of the country from \$2,460,520,000 to \$8,422,621,000, or by \$5,962,101,000, equal to 242.3 per cent.

In the twenty years the value of manufactured products increased in the South from \$622,840,000 to \$1,860,113,000, or by \$1,237,273,000, equal to 198.7 per cent., and in the rest of the country from \$4,746,739,000 to \$11,149,924,000, or by \$6,403,185,000, equal to 134.9 per cent. In the first ten years of the period the increase in the South was from \$622,840,000 to \$1,242,581,000, or by \$619,741,000, equal to 99.5 per cent., and in the rest of the country from \$4,746,739,000 to \$8,129,798,000, or by \$3,383,059,000, equal to 71.3 per cent. In the second half the increase in the South amounted to \$617,532,000, or at the rate

MANUFACTURING INCREASE 1890-1900.*

States.	Capital.		Products.	
	Amount.	P. C.	Amount.	P. C.
Alabama	\$24,247,000	52.5	\$29,514,000	57.6
Arkansas	20,989,000	140.1	22,539,000	99.5
District of Columbia ..	13,116,000	45.4	8,337,000	21.2
Florida	21,997,000	197.9	18,587,000	101.9
Georgia	32,868,000	57.7	37,738,000	54.7
Kentucky	24,259,000	30.4	27,446,000	21.6
Louisiana	78,330,000	225.4	63,375,000	109.5
Maryland	43,480,000	36.3	70,710,000	41.1
Mississippi	20,910,000	140.3	21,725,000	116.1
Missouri	60,330,000	31.8	60,931,000	18.8
North Carolina	43,758,000	133.6	54,545,000	135.1
Oklahoma	5,676,000	1890.	10,547,000	2458.5
South Carolina	38,080,000	130.	26,822,000	84.
Tennessee	20,339,000	39.5	35,790,000	49.4
Texas	43,619,000	93.1	48,981,000	69.5
Virginia	40,214,000	63.3	43,809,000	49.6
West Virginia	27,786,000	98.8	36,136,000	93.3
Total	\$559,998,000	65.9	\$617,532,000	49.7
United States	\$3,306,436,000	50.6	\$3,637,658,000	38.8

*Including hand trades and neighborhood industries.

facturing capital in 1880 and 1890, and the rate of increase in the value of factory products was greater than the average annual rate of increase in the value of manufactured products in the earlier period, when, of course, the actual increases showed a large rate of increase.

The actual increase in the amount of capital invested in Southern factories between 1900 and 1909 was more than three times the increase in manufacturing capital in the South between 1890 and 1900, and was \$280,000,000 greater than the actual capital invested in manufacturing in the South in 1900.

The actual increase in the value of factory products between 1900 and 1909, which amounted to \$1,593,923,000, was \$976,391,000 greater than the increase in the value of manufactured products in the preceding ten years, and \$356,650,000 greater than the increase between 1880 and 1900, and the actual value of factory products in 1909 was more than five times as great as the value of manufactured products in 1880 in the South, while the 1909 value of factory products in the whole country was less than four times as great as the value of manufactured products in the United States in 1880.

Through the whole period Missouri has ranked first and Maryland second both as to the capital invested in manufacturing industry and as to the value of its products. But there have been interesting and suggestive shiftings of the relative positions of other States in both particulars in the meantime.

As to capital, the \$72,508,000 of Missouri and the \$58,742,000 of Maryland in 1880 were followed by Kentucky, \$45,813,000; Virginia, \$26,969,000; Georgia, \$20,672,000; Tennessee, \$20,093,000; West Virginia, \$13,883,000; North Carolina, \$13,046,000; Louisiana, \$11,462,000; South Carolina, \$11,206,000; Alabama, \$9,668,000; Texas, \$9,246,000; District of Columbia, \$5,553,000; Mississippi, \$4,728,000; Florida, \$3,211,000, and Arkansas, \$2,953,000. By 1890 Oklahoma had begun to figure in the situation, and notable strides toward the front had been made by Texas and Alabama, the former changing from twelfth to seventh place and the latter from eleventh to eighth place. The rank in that year of the States was: Missouri, \$189,559,000; Maryland, \$119,667,000; Kentucky, \$79,812,000; Virginia, \$63,457,000; Georgia, \$56,922,000; Tennessee, \$51,475,000;

Texas, \$46,815,000; Alabama, \$46,123,000; Louisiana, \$34,754,000; North Carolina, \$32,746,000; South Carolina, \$29,276,000; District of Columbia, \$28,865,000; West Virginia, \$28,118,000; Arkansas, \$14,972,000; Mississippi, \$14,897,000; Florida, \$11,110,000, and Oklahoma, \$300,000. In the next ten years Louisiana moved from ninth place to third and North Carolina from tenth place to eighth, the rank by States in 1900 being Missouri, \$249,889,000; Maryland,

Arkansas, \$70,139,000; Florida, \$65,128,000; Oklahoma, \$38,873,000, and District of Columbia, \$30,553,000.

Between 1900 and 1909 Oklahoma led in the rate of increase in the amount of capital invested in factories with 858.8 per cent., and Missouri led in the actual increase with \$219,066,000, followed by Texas, \$153,220,000; North Carolina, \$148,900,000; Virginia, \$124,092,000; Georgia, \$123,610,000; Louisiana,

NINE YEARS OF FACTORY PROGRESS.

CAPITAL INVESTED.*

States.	1900.	1904.	1909.
Alabama	\$60,166,000	\$105,383,000	\$173,479,000
Arkansas	25,385,000	46,306,000	70,139,000
District of Columbia	17,960,000	20,200,000	30,553,000
Florida	25,682,000	32,972,000	65,128,000
Georgia	79,303,000	135,212,000	202,913,000
Kentucky	87,996,000	147,282,000	172,779,000
Louisiana	100,875,000	150,811,000	221,806,000
Maryland	149,155,000	201,878,000	251,237,000
Mississippi	22,712,000	50,256,000	72,393,000
Missouri	223,781,000	379,369,000	442,847,000
North Carolina	68,283,000	141,001,000	217,183,000
Oklahoma	4,054,000	16,124,000	38,873,000
South Carolina	62,750,000	113,422,000	173,221,000
Tennessee	63,141,000	102,439,000	167,924,000
Texas	63,656,000	115,665,000	216,876,000
Virginia	92,300,000	147,989,000	216,392,000
West Virginia	49,103,000	86,821,000	150,923,000
Total	\$1,196,302,000	\$1,993,130,000	\$2,884,666,000
United States	\$8,975,256,000	\$12,675,581,000	\$18,428,270,000

*Not including hand-trades and neighborhood industries.

VALUE OF PRODUCTS.*

States.	1900.	1904.	1909.
Alabama	\$72,110,000	\$109,170,000	\$146,431,000
Arkansas	39,888,000	53,864,000	74,818,000
District of Columbia	16,426,000	18,359,000	25,289,000
Florida	34,184,000	50,298,000	72,724,000
Georgia	94,532,000	151,040,000	202,641,000
Kentucky	126,509,000	159,754,000	223,754,000
Louisiana	111,398,000	186,380,000	223,928,000
Maryland	211,076,000	243,376,000	317,570,000
Mississippi	33,719,000	57,451,000	80,555,000
Missouri	316,304,000	439,549,000	572,085,000
North Carolina	85,274,000	142,521,000	216,614,000
Oklahoma	8,134,000	24,459,000	53,682,000
South Carolina	53,336,000	79,376,000	113,236,000
Tennessee	92,749,000	137,960,000	180,130,000
Texas	92,894,000	150,528,000	272,896,000
Virginia	108,644,000	148,857,000	219,794,000
West Virginia	67,007,000	99,041,000	161,960,000
Total	\$1,564,184,000	\$2,251,983,000	\$3,158,107,000
United States	\$11,406,927,000	\$14,793,903,000	\$20,672,052,000

*Not including hand-trades and neighborhood industries.

INCREASE IN CAPITAL INVESTED.*

States.	1900-1904.	P. C.	1904-1909.	P. C.
Alabama	\$45,217,000	75.	\$68,096,000	64.6
Arkansas	20,921,000	82.4	23,833,000	51.5
District of Columbia	2,240,000	12.5	10,353,000	51.2
Florida	7,290,000	28.4	32,156,000	97.5
Georgia	55,909,000	70.5	67,701,000	50.
Kentucky	59,286,000	67.6	25,497,000	17.3
Louisiana	49,936,000	49.5	70,995,000	47.
Maryland	52,723,000	35.3	49,359,000	24.4
Mississippi	27,544,000	121.3	22,137,000	44.
Missouri	155,588,000	69.5	63,478,000	16.7
North Carolina	72,718,000	106.5	76,182,000	54.
Oklahoma	12,070,000	297.7	22,749,000	141.1
South Carolina	50,672,000	80.7	59,799,000	52.6
Tennessee	39,298,000	62.3	65,485,000	63.9
Texas	52,009,000	81.7	101,211,000	87.5
Virginia	55,689,000	60.3	68,403,000	46.2
West Virginia	37,718,000	76.8	64,102,000	74.
Total	\$796,828,000	66.6	\$891,536,000	44.7
United States	\$3,700,325,000	41.2	\$5,752,689,000	45.4

*Not including hand-trades and neighborhood industries.

INCREASE IN VALUE OF PRODUCTS.*

States.	1900-1904.	P. C.	1904-1909.	P. C.
Alabama	\$37,060,000	51.4	\$37,261,000	34.1
Arkansas	13,976,000	35.	20,954,000	38.9
District of Columbia	1,933,000	11.8	6,930,000	37.7
Florida	16,114,000	47.1	22,426,000	44.6
Georgia	56,508,000	59.8	51,601,000	34.1
Kentucky	33,245,000	26.3	64,000,000	40.1
Louisiana	74,982,000	67.3	37,548,000	20.1
Maryland	32,300,000	15.3	74,194,000	30.5
Mississippi	23,732,000	70.4	23,104,000	40.2
Missouri	123,245,000	38.9	132,536,000	30.1
North Carolina	57,247,000	67.1	74,093,000	51.9
Oklahoma	16,325,000	200.7	29,223,000	119.4
South Carolina	26,040,000	48.8	33,860,000	42.7
Tennessee	45,211,000	48.8	42,170,000	30.6
Texas	57,634,000	62.	122,368,000	81.2
Virginia	40,213,000	37.	70,937,000	47.6
West Virginia	32,034,000	47.9	62,919,000	64.
Total	\$687,799,000	43.9	\$906,124,000	40.2
United States	\$3,386,976,000	29.7	\$5,878,149,000	39.7

*Not including hand-trades and neighborhood industries.

\$163,147,000; Louisiana, \$113,084,000; Kentucky, \$104,071,000; Virginia, \$103,671,000; Texas, \$90,434,000; Georgia, \$89,790,000; North Carolina, \$76,504,000; Tennessee, \$71,814,000; Alabama, \$70,370,000; South Carolina, \$67,356,000; West Virginia, \$55,904,000; District of Columbia, \$41,981,000; Arkansas, \$35,961,000; Mississippi, \$35,807,000; Florida, \$33,107,000, and Oklahoma, \$5,976,000. In those twenty years there were tremendous increases in all of the States in the amount of capital invested in manufacturing, but the aggregate increase of \$1,079,113,000 was \$609,251,000 less than the increase of \$1,688,364,000 in the amount of capital invested in factories alone between 1900 and 1909.

In 1909 the capital invested in factories in Missouri was \$113,094,000 greater than all the capital invested in manufacturing in the South in 1880, and the factory capital in the whole South was \$94,393,000 greater than the manufacturing capital of the United States in 1880. The rank of Southern States in the amount of capital invested in factories in 1909 showed some decided changes from the situation in 1900, Missouri being first, with \$442,847,000, followed by Maryland, \$251,237,000; Louisiana, \$221,806,000; North Carolina, \$217,183,000; Texas, \$216,876,000; Virginia, \$216,392,000; Georgia, \$202,913,000; Alabama, \$173,479,000; South Carolina, \$173,221,000; Kentucky, \$172,779,000; Tennessee, \$167,924,000; West Virginia, \$150,923,000; Mississippi, \$72,393,000;

FACTORY INCREASES, 1900-1909.*

States.	Capital.	Products.
	Amount. P. C.	Amount. P. C.
Alabama	\$113,313,000 171.7	\$74,321,000 103.
Arkansas	44,754,000 172.3	34,930,000 87.6
District of Columbia	12,593,000 70.1	8,863,000 54.6
Florida	39,446,000 153.6	38,540,000 112.7
Georgia	123,610,000 155.8	108,109,000 114.3
Kentucky	84,783,000 96.3	97,245,000 76.8
Louisiana	120,931,000 119.8	112,530,000 101.
Maryland	102,082,000 68.3	106,494,000 50.4
Mississippi	49,681,000 218.7	46,836,000 138.6
Missouri	219,066,000 97.9	255,781,000 80.9
North Carolina	148,900,000 218.	131,340,000 155.3
Oklahoma	34,819,000 858.8	45,548,000 559.9
South Carolina	110,471,000 176.	59,900,000 112.3
Tennessee	104,783,000 165.9	87,381,000 94.2
Texas	153,220,000 240.7	180,002,000 193.8
Virginia	124,092,000 134.4	111,150,000 102.3
West Virginia	101,820,000 207.3	94,953,000 141.7
Total	\$1,688,364,000 141.1	\$1,593,923,000 101.9
United States	\$9,453,014,000 105.3	\$9,265,125,000 81.2

*Not including hand-trades and neighborhood industries.

\$120,931,000; Alabama, \$113,313,000; South Carolina, \$110,471,000; Tennessee, \$104,783,000; Maryland, \$102,082,000; West Virginia, \$101,820,000; Kentucky, \$84,783,000; Mississippi, \$49,681,000; Arkansas, \$44,754,000; Florida, \$39,446,000; Oklahoma, \$34,819,000, and the District of Columbia, \$12,593,000.

As to the value of products there have been similar striking illustrations of progress. The combined value of the products in 1880 in Maryland and Missouri, where industrial progress had been far less interrupted in the previous twenty years than in the rest of the South, was more than 44 per cent. of the value of the products in the whole South. This proportion had been reduced to 28 per cent. in 1909. In that was reflected the expansion in Southern industry. In the thirty-odd years Missouri and Maryland did not lose their rank. In 1880 the order was Missouri, \$165,386,000; Maryland, \$106,781,000; Kentucky, \$75,483,000; Virginia, \$51,781,000; Tennessee, \$37,075,000; Georgia, \$36,441,000; Louisiana, \$24,205,000; West Virginia, \$22,867,000; Texas, \$20,720,000; North Carolina, \$20,095,000; South Carolina, \$16,738,000; Alabama, \$13,566,000; District of Columbia, \$11,882,000; Mississippi, \$7,518,000; Arkansas, \$6,756,000, and Florida, \$5,546,000.

By 1890 the order had become Missouri, \$324,562,000; Maryland, \$171,843,000; Kentucky, \$126,720,000; Virginia, \$88,364,000; Tennessee, \$72,355,000;

Texas, \$70,434,000; Georgia, \$68,917,000; Louisiana, \$57,807,000; Alabama, \$51,227,000; North Carolina, \$40,375,000; District of Columbia, \$39,331,000; West Virginia, \$38,702,000; South Carolina, \$31,927,000; Arkansas, \$22,659,000; Mississippi, \$18,706,000; Florida, \$18,223,000, and Oklahoma, \$429,000,000.

Missouri, Maryland, Kentucky and Virginia did not change their rank in twenty years, and in 1900 the order stood Missouri, \$385,493,000; Maryland, \$242,553,000; Kentucky, \$154,166,000; Virginia, \$132,173,000; Louisiana, \$121,182,000; Texas, \$119,415,000; Tennessee, \$108,145,000; Georgia, \$106,655,000; North Carolina, \$94,920,000; Alabama, \$80,741,000; West Virginia, \$74,838,000; South Carolina, \$58,749,000; District of Columbia, \$47,668,000; Arkansas, \$45,198,000; Mississippi, \$40,431,000; Florida, \$36,810,000, and Oklahoma, \$10,976,000. The year 1909 showed clearly the marked shifting that had occurred, Missouri still ranking first with \$572,085,000, and Maryland second, with \$317,570,000, while Texas had moved from ninth place in 1880 to third with \$272,896,000; Louisiana from seventh to fourth, with \$223,928,000; Kentucky from third to fifth, with \$223,754,000; Virginia from fourth to sixth, with \$219,794,000; North Carolina from tenth to seventh, with \$216,614,000; Georgia from sixth to eighth, with \$202,641,000; Tennessee from fifth to ninth, with \$180,130,000; Alabama from twelfth to tenth, with \$146,431,000; West Virginia from eighth to eleventh, with \$161,960,000; South Carolina from eleventh to twelfth, with \$113,236,000; Mississippi from fourteenth to thirteenth, with \$80,555,000; Arkansas from fifteenth to fourteenth, with \$74,818,000; Florida from sixteenth to fifteenth, with \$72,724,000; District of Columbia from thirteenth to seventeenth, with \$25,289,000, while Oklahoma, with \$53,682,000, held sixteenth place.

With \$45,548,000 added in nine years to \$8,134,000 in the value of its factory products, the rate of increase in Oklahoma in the value of such products was 559.9 per cent., but the actual increase was not one-fifth of the actual increase in Missouri, which, having a rate of 80.9 per cent., led in actual increase with \$255,781,000, being followed by Texas, \$180,002,000; North Carolina, \$131,340,000; Louisiana, \$112,530,000; Virginia, \$111,150,000; Georgia, \$108,109,000; Maryland, \$106,494,000; Kentucky, \$97,245,000; West Virginia, \$94,953,000; Tennessee, \$87,381,000; Alabama, \$74,321,000; South Carolina, \$59,900,000; Mississippi, \$46,836,000; Oklahoma, \$45,548,000; Florida, \$38,540,000; Arkansas, \$34,930,000, and the District of Columbia, \$8,863,000. Between 1900 and 1909 the value of factory products in the country increased at the rate of 81.2 per cent. and in the South at 101.9 per cent. Only the District of Columbia, with an increase of 54.6 per cent.; Kentucky, 76.8 per cent.; Maryland, 50.4 per cent., and Missouri, 80.9 per cent., had a rate of increase less than the average for the country, and they, with Arkansas, 87.6 per cent.; Louisiana, 101 per cent., and Tennessee, 94.2 per cent., were the only ones having rates below the average for the South, the other Southern States having the following rates of increase: Oklahoma, 559.9 per cent.; Texas, 193.8 per cent.; North Carolina, 155.3 per cent.; West Virginia, 141.7 per cent.; Mississippi, 138.6 per cent.; Georgia, 114.3 per cent.; Florida, 112.7 per cent.; South Carolina, 112.3 per cent.; Alabama, 103 per cent., and Virginia, 102.3 per cent.

Speaking generally, these rates of increase indicate the special lines upon which Southern manufacturing has developed. In the first ten years of the rebound from the compulsory inertia following the war manufacturing naturally was dominated by the industries whose outputs were largely primary products of the materials from the fields, forests and the mines of the South. In the days of rehabilitation it was noted that the destruction of the war had taken a special turn against cotton factories, and that not only were the mills destroyed, but that the machinery was broken into small bits and scattered over the country for miles around. To that situation was attributed the pronounced inclination to revive the textile industry, although that was probably influenced also largely by the attention given in agriculture to cotton-raising under the sway of the long-preached doctrine of the greater advantage to the section in having cotton mills close to the cotton fields. There was much patching done, of course, and much old-style machinery installed in the cotton mills at first, but the great advantage enjoyed by the Southern mills today, when they are consuming more than half the cotton consumed in this country and to an amount greater than that consumed by all the mills of the country in 1880, and greater than the total crop raised in the first year after the war has come as a result of the hard pioneering struggles of those early days.

Though another product of the cotton plant, its seed, was for more than half a century regarded pretty much as a nuisance to be gotten rid of as easily as possible, after the quantity necessary for planting had been reserved, the value of the seed for its oil and meal was recognized by a few progressive minds, and it was crushed for commercial purposes in the South nearly eighty years ago. There were, before 1860, cottonseed mills in South Carolina, Alabama, Mississippi and Louisiana, with tentative efforts at crushing in Virginia, the oil being regarded as valuable for cooking, for lubrication, for painting and for illumination, and the refuse for feeding stock, for soap-making and for fertilizing, and the industry had made such an advance that the discovery of petroleum in Pennsylvania late in the fifties was looked upon in some quarters chiefly as a factor in influencing the price of cotton oil.

The section, which in colonial days had shipped manufactured iron to England, where Virginia and North Carolina had made before the Revolution hoes to be sold in New York, and where, before 1850, Tennessee and Kentucky had shipped by water iron to Pittsburgh, could not possibly have escaped reviving its iron industry, but that lagged at first because of the slowness of the South to substitute coke for charcoal in iron-making and to avail itself of the superiority of the rolling-mill in making bar iron, and, added to that, was the sudden change to the use of steel instead of iron, when the South was without a steel plant. But Shelby iron, which had played an important part as protection for the "Virginia" in its battle with the "Monitor," when naval warfare was revolutionized, could not for long keep its light hid under a bushel. Experiments with coke ovens were undertaken in Tennessee in the sixties, Birmingham was founded in 1870, but made very little progress until about 1880. Sheffield, Bessemer, Anniston, Roanoke and other places came

to the front in iron-making between 1880 and 1890. In 1895 the sale of Alabama pig-iron in Liverpool for less than Middlesboro iron, produced not far away, the exports during 12 months having been about 250,000 tons, attracted wide attention in this country and abroad. These exports were made under unusual conditions of extreme depression and low prices of iron in this country. In order to get rid of surplus stocks, Alabama iron-makers sold in foreign markets at little or no profit. It was regarded, however, as wiser to do this than to shut down the furnaces until better times. Somewhat similar conditions have prevailed for several months, and during the closing weeks of 1911 and the early part of 1912 fairly large exports of Alabama iron have been made to get rid of surplus stocks. The exports of 1895 ceased as soon as the better times at home brought an enlarged demand for iron. Conditions hardly warrant any expectations that the South can in the near future become a regular exporter of pig-iron on any large scale, but in the marketing of the finished product, such as steel rails and some forms of machinery, the indications are promising for a steady growth in the foreign trade. Alabama steel rails have within the last two or three years been exported quite heavily to South America, and steel rails made in Maryland have regular markets as far away as China and Australia.

The South had originally nearly half of the 856,690,000 acres of timber land of the country. But, although its vast pine forests had been depended upon for many years as the source of material for the naval stores industry, and local lumbering operations had made considerable inroads, it was not until after 1880 that the depletion of white pine and hardwood supplies in other parts of the country began to turn the attention of lumber interests upon the South. Between 1880 and 1890 the lumber cut of the South increased nearly 70 per cent.; in the next decade the increase was more than 123 per cent. For several years recently the South has been cutting more than half the lumber of the country, and within the past twenty years has been giving greater attention to the working up of the lumber at home instead of shipping it to other parts of the country to be returned in the shape of furniture, vehicles and the parts of implements. At one point where the woodworking industry was started in a small way about 20 years ago there are now thirty furniture factories, around which have grown up cotton mills, machine shops and other industries to the number of forty. The South has begun, too, to use the wastes of the lumber industry in the manufacture of paper and for the derivation of alcohol, both ethyl and methyl, and chemicals of various kinds.

Flouring mills of the South, especially in the neighborhood of Baltimore and Richmond, once held the trade with South America, creating return cargoes for the imports of coffee, sugar and molasses. Fiscal policies of Brazil and the destruction of the sugar refining business at Baltimore combined to interrupt this industry for a while, as far as it was related to the export trade, and the rise of the Northwestern milling interests, with the big wheat-growing country behind them, also had its effect. But today three or four flour mills at Richmond are making for export to lands as distant as the heart of the Sahara in Africa more flour than was milled in all the establishments there fifty years ago.

Directly connected with the packing-house industry, which is assuming considerable proportions with the demonstration of its value in six or seven States, has been the rise of ice-making plants and cold-storage establishments. Some of these are operated as adjuncts to electric-lighting, many of them manufacture ice for sale locally or at nearby points, and some of them have come into existence in consequence of the use of trains of refrigerator cars for transporting poultry and early fruits and vegetables to distant markets. The plant of small capacity at New Orleans forty years ago was pioneer in a field now occupied by several hundred, and the rapidity of the building of such establishments is shown in the fact that in one Texan city where 30,000 tons of ice were artificially produced ten years ago there are now 13 establishments turning out 360,000 tons a year. In less than six months last year plans were made for more than 150 ice factories or cold-storage plants in the South having daily capacities ranging from five tons to six carloads of ice, most of them being enterprises of comparatively small proportions, but representing in the aggregate an investment quite close to \$10,000,000.

Petroleum production has been followed by the establishment of great refineries; the development of cane-growing in Louisiana and Texas has caused the building of many new sugar mills and refining plants, including a \$5,000,000 refinery at New Orleans, one of the largest in the world; the Joplin district of Missouri has become the great world center of lead and zinc production, the developing area now extending into Oklahoma; East Tennessee, North Carolina and Virginia are growing in importance in the production of copper; the fertilizer plants in the neighborhood of Charleston, born in the uncovering of the phosphate deposits in South Carolina, are a part of a great fertilizer industry covering the whole Central South, and using not only the phosphate rock of the South, but its sulphur, pyrites, cottonseed and other mineral and vegetable products, and a great bulk of the tobacco manufacturing of the country, from the plug and cigarette factories of Virginia to the fine Cuban leaf cigars of Tampa and Key West, is done in the South. Steel ship-building at Newport News, Va., and Sparrows Point, Md., has placed the South to the front in the building of warships for the Government and splendid steamships for the coastwise and foreign trade. The Newport News plant is one of the largest ship-yards in the world, while the Sparrows Point plant includes furnaces which produce the pig-iron from Cuban ores and carry it to the finished product of the ship. Then there are cast-iron pipe plants, stove foundries, wire nail mills, locomotive works, car shops, brick and tile works, tanneries, packing-houses, ice factories, potteries, glass works, marble and stone plants, rice mills, boot and shoe factories, furniture factories, vehicle works, and a host of other industries have developed around the pioneers dealing at first hand with the raw material, and the only question of a serious character connected with the future of the industrial South is that of its extent and the command of sufficient capital of mind, muscle and money to make the most of the natural advantages.

Southern Ports as Gateways of World Trade

Through Southern ports in the fiscal year, 1880, was exported merchandise to the value of \$264,905,753. In 1911 a single Southern port, Galveston, exported merchandise to the value of \$220,504,917, an amount only \$44,400,836 less than the value of exports from all Southern ports 31 years before.

Galveston, which ranked second to New York in the value of its exports in 1911, exported more than twice as much as all the ports of the Pacific Coast of the United States combined.

In the same year New Orleans, ranking third in exports, sent abroad goods to the value of \$172,835,293, which was \$31,344,831 more than the combined values of the exports of Boston and Philadelphia; Baltimore, ranking fourth, with \$85,120,843, exported more than twice as much as San Francisco, and Savannah, ranking fifth, with \$72,076,945, exported nearly twice as much as Portland, Oregon.

The value of exports from Southern ports in 1880 was 31.8 per cent. of the total value, \$835,638,658, of exports from all ports of the country in that year. In 1911 the value of exports from Southern ports was only \$87,816,310 less than the value of all the exports of the country in 1880, and 36.5 per cent. of the total value, \$2,049,320,199, of the country's exports in 1911.

In thirty-two years the South exported merchandise valued at \$12,859,839,040, or 34.4 per cent. of the total value, \$36,947,505,686, of all the country's exports in that period.

TOTAL COMMERCE IN INDIVIDUAL SOUTHERN DISTRICTS IN 32 YEARS.

Customs Districts.	Exports.	Imports.
Albemarle, N. C.		\$56
Alexandria, Va.	\$914,028	232,437
Apalachicola, Fla.	7,476,594	25,878
Atlanta, Ga.	1,550	1,590,527
Baltimore, Md.	2,445,633,199	584,089,589
Beaufort, N. C.	68,238	144,784
Beaufort, S. C.	37,073,546	1,919,467
Brazos de Santiago, Tex.	20,308,931	10,144,115
Brunswick, Ga.	218,475,369	848,878
Charleston, S. C.	365,069,747	48,711,236
Chattanooga, Tenn.		143,733
Corpus Christi, Tex.	175,963,351	51,624,647
Fernandina, Fla.	85,192,651	1,163,174
Galveston, Tex.	2,446,416,271	62,515,540
Georgetown, D. C.	31,734	8,592,359
Georgetown, S. C.	686,095	1,367
Houston, Tex.		362,566
Jacksonville, Fla.	11,724,759	4,676,774
Kansas City, Mo.	697,135	17,746,324
Key West, Fla.	25,109,205	24,643,249
Knoxville, Tenn.		91,797
Louisville, Ky.	585	12,793,786
Memphis, Tenn.		3,009,171
Mobile, Ala.	339,648,545	55,959,075
Nashville, Tenn.		1,103,211
New Orleans, La.	3,598,420,402	722,163,894
Newport News, Va.	419,611,844	39,313,391
Norfolk and Portsmouth, Va.	388,863,961	13,927,731
Pamlico, N. C.	194,303	662,615
Paso del Norte, Tex.	120,303,656	75,662,724
Pearl River, Miss.	86,029,849	481,165
Pensacola, Fla.	284,427,898	12,526,341
Petersburg, Va.	350,520	1,233,984
Richmond, Va.	68,184,083	7,360,263
Sabine, Tex.	77,524,786	279,958
St. Augustine, Fla.	32,672	336,550
St. Joseph, Mo.		4,716,566
St. Louis, Mo.	12,406	107,828,061
St. Marks, Fla.	12,100,434	123,164
St. Marys, Ga.	909,086	215
Saluria, Tex.	91,119,360	42,402,035
Savannah, Ga.	1,143,612,356	31,307,785
Tampa, Fla.	39,502,418	44,512,754
Tappahannock, Va.	12,300	
Teche, La.	198,590	3,978,669
Vicksburg, Miss.		2
Wilmington, N. C.	347,936,583	13,720,205
Total South	\$12,859,839,040	\$2,014,671,812

In thirty-two years the value of exports from Southern ports has increased 182.3 per cent., and the value at all other ports of the country, 128.2 per cent.

In thirty-two years the value of imports at Southern ports increased 338.1 per cent., and at all other ports 116.8 per cent.

While 36 per cent. of the country's exports now pass through Southern ports, nearly half of all the exports depend directly or indirectly upon Southern production. In the past fiscal year this Southern production in exports was represented by \$585,319,000 worth of raw cotton, \$40,852,000 of manufactured cotton goods and \$27,491,000 of cottonseed, cottonseed cake, meal and oil, a total of \$653,662,000 based upon the cotton plant alone; \$25,023,000 naval stores and \$9,069,000 phosphate rock, a total of \$687,754,000 of products, distinctively Southern in their origin and constituting 33.5 per cent. of the total value of exports. But, in addition, the South had a share amounting to \$75,000,000 in exports of lumber and its products, \$37,000,000 of tobacco, \$35,000,000 of mineral oil, \$29,000,000 of coal and \$80,000,000 of foodstuffs, and iron and steel products, etc., totalling \$265,000,000 and bringing the aggregate of merchandise exports of Southern origin to \$944,000,000, about 47 per cent. of the total value, \$2,049,000,000, of all merchandise exports.

These are facts typical of the Southern trend of American commerce that has been strongly manifested in recent years, and which is destined to

TOTAL SOUTHERN COMMERCE COMPARED WITH THE TOTAL COMMERCE OF THE COUNTRY.

Years Ended June 30.	Southern Customs Districts.		All Customs Districts.	
	Exports.	Imports.	Exports.	Imports.
1880	\$264,905,753	\$35,906,460	\$835,638,658	\$667,954,746
1881	301,173,415	37,485,734	902,377,346	642,664,628
1882	206,327,754	35,980,114	750,542,257	724,639,574
1883	267,562,811	30,818,376	823,839,402	723,180,914
1884	218,743,985	28,397,398	740,513,609	667,697,693
1885	213,430,190	29,215,389	742,189,755	577,527,329
1886	206,235,653	30,157,040	679,524,830	635,436,136
1887	230,836,876	35,568,772	716,183,211	692,319,768
1888	230,302,530	37,647,740	695,954,507	723,957,114
1889	237,036,846	46,461,902	742,401,375	745,131,652
1890	311,742,748	46,378,696	857,828,684	789,310,409
1891	333,771,962	60,727,309	884,480,810	844,916,196
1892	368,998,230	51,730,456	1,030,278,148	827,402,462
1893	271,715,014	58,030,541	847,665,194	866,400,922
1894	296,254,840	44,361,824	892,140,572	654,994,622
1895	266,309,955	38,572,042	807,538,165	731,969,965
1896	276,345,515	41,196,034	882,606,938	779,724,674
1897	375,497,388	41,814,817	1,050,993,556	764,730,412
1898	441,684,328	32,179,629	1,231,482,330	616,049,654
1899	411,524,944	37,035,674	1,227,023,302	697,148,489
1900	484,651,682	57,030,284	1,394,483,082	849,941,184
1901	528,956,722	63,030,702	1,487,764,991	823,172,165
1902	472,894,869	72,183,141	1,381,719,401	903,320,948
1903	508,237,268	87,035,380	1,420,141,679	1,025,719,237
1904	559,243,502	83,043,477	1,460,827,271	991,087,371
1905	555,481,202	89,551,965	1,518,561,666	1,117,513,071
1906	642,032,763	108,826,248	1,743,864,500	1,226,562,446
1907	734,265,865	130,807,244	1,880,851,078	1,434,421,425
1908	648,100,678	115,806,358	1,860,773,346	1,194,341,792
1909	619,221,614	112,208,883	1,663,011,104	1,311,920,224
1910	628,529,790	138,170,927	1,744,984,720	1,556,947,430
1911	747,822,348	157,311,256	2,049,320,199	1,527,966,105
Total	\$12,859,839,040	\$2,014,671,812	\$36,947,505,686	\$28,336,070,757

become much more pronounced with the completion of the Panama Canal.

Many influences have contributed to this significant increase of the importance in commerce of the section which even now has only about a third of the population of the country and embraces less than 32 per cent. of the land area of continental United States.

In the first place Nature marked the South for commerce, even of the most primitive character. The coast line, greater than that of any other section of the country and extending between 2500 and 3000 miles along the Atlantic Ocean and the Gulf of Mexico, which is destined to be the Mediterranean of the West, is indented with many safe and commodious harbors. On the northeast it is pierced by the broad Chesapeake estuary nearly 200 miles long, with its Susquehanna, Patapsco, Potomac, Rappahannock, York, Elizabeth and James tributary rivers, while at many other points smaller bays and sounds are at the mouths of streams extending well into the interior of the country. These rivers are a part of a great netlike system of waterways in the South with aggregate navigable length of more than 19,000 miles, some of them branches of the great Mississippi, which drains 1,250,000 square miles, or nearly 43 per cent. of the area of the United States, and with its tributaries is navigable for 12,659 miles.

The natural harbors had in a number of cases been selected in the early days, when Indian trails from the east to the west were followed by pioneer salesmen, when traders' caravans made a constantly widening track skirting the Appalachian range from Carlisle, Pa., to Charleston and Savannah, when Charleston was a regular port of call for sailing vessels plying between Europe and America and before the building of the Erie Canal had diverted to New York, in prophecy of east to west railroad construction, the merchandise for export that otherwise would have passed down the Ohio River and the Mississippi by barges and flatboats to New Orleans. The strategic importance of that city as an entrepot had weight in the addition of Louisiana to the United States, and Lafitte found Galveston Island a convenient rendezvous in the time when, for boldness and enterprise, buccaneering still was ahead of legitimate commerce. A little later Baltimore-built clippers were carrying the trade of this country to the four quarters of the globe, and the first steam vessel to cross the Atlantic was sent forth by progressive men of Savannah.

To the convenience of natural harbors was added the possession of vast natural resources upon which the commerce of the world is based, four hundred million of the eight hundred and fifty-seven million acres of the original forest area of the country, six hundred and twenty billion of the three trillion, two hundred billion tons of coal, twelve or fifteen billion tons of iron ore, immense stores of sulphur, petroleum, lead, zinc and other minerals, and five hundred and fifty million acres of land capable of producing practically every crop needed by man. Colonial policies stamped the South as a contributor to export trade, mainly through agriculture in the beginning, and today the bulk of outward-bound commerce through Southern ports still originates upon farms and plantations. The fact that the invention of the cotton gin gave an impetus to the manufacturing instincts of the North, while suppressing those of the South, was the fact determining for a century or more the character of Southern exports. The cotton gin made possible, at a time when capital in New England was obliged to turn from one form of foreign commerce into other channels, to find productive occupation in cotton manufacturing in a region where cotton cannot be grown, and at the same time brought cotton into a leading position in Southern agriculture and directed much of the capital of the South into investments in agricultural operations.

Peopling of the Mississippi Valley was largely by the farming class, even for many years after the importance of manufacturing had begun to overtake that of agriculture, and the surplus products of the pioneers tended to seek foreign markets by way of the system of rivers uniting in the volume that flows past New Orleans on its way to the Gulf. Without artificial means of transportation, outward bound trade of the Mississippi Valley sought that city just as certainly as the washings of the soils of many States extending from Pennsylvania to the Dakotas are carried thousands of miles to build up more territory for Louisiana. It was to reach these farm products that led New York, with its early developed commercial instincts, to construct the Erie Canal, and the West was the goal of the first steam railroad built in the country, starting at Baltimore, and of the one among the first starting at another Southern port, Charleston.

The effect of these efforts to link the West and the seaboard was to change for many years the course of the products of the upper Mississippi Valley from New Orleans and other Gulf ports to Northern ports or to those of the

EXPORTS FROM SOUTHERN CUSTOMS DISTRICTS, 1880-1911, BY DECADES.

Customs Districts.	1880.	1890.	1900.	1910.	1911.
Alexandria, Va.....	\$42,180	.....	.....	.....	.....
Apalachicola, Fla.....	7,474	\$195,747	\$424,783	\$205,386	\$367,382
Baltimore, Md.....	76,253,566	73,983,693	115,530,378	77,381,507	85,120,843
Beaufort, S. C.....	1,952,644	1,140,656	189,908	37,700	15,000
Brazo di Santiago.....	2,350,829	750,882	210,375	152,095	511,520
Brunswick, Ga.....	966,582	7,757,564	7,373,487	14,592,614	14,138,847
Charleston, S. C.....	19,591,127	13,788,751	7,151,720	8,104,821	8,950,359
Corpus Christi, Tex.....	643,294	3,144,288	6,205,430	11,581,111	12,876,106
Fernandina, Fla.....	262,871	296,124	2,588,808	5,899,509	7,549,342
Galveston, Tex.....	16,749,889	24,446,831	85,657,524	173,178,992	220,504,917
Georgetown, D. C.....	20,039	.....	.....	.....	3,974
Georgetown, S. C.....	41,492	22,436	.....	22,994	14,689
Jacksonville, Fla.....	88,115	41,561	269,611	2,391,090	2,647,882
Kansas City, Mo.....	.....	.....	7,505	40,258	371,870
Key West, Fla.....	1,052,806	436,400	1,395,326	1,038,024	1,557,968
Louisville, Ky.....	.....	.....	.....	585	.....
Mobile, Ala.....	7,188,740	3,372,429	13,206,334	27,526,245	30,154,037
New Orleans, La.....	90,442,019	108,126,891	115,858,764	140,376,560	172,835,293
Newport News, Va.....	.....	6,958,369	34,758,323	5,059,261	5,468,480
Norfolk & Ports, Va.....	14,065,455	14,247,477	13,112,096	8,155,818	9,628,932
Pamlico, N. C.....	21,037	17,538	2,005	.....	.....
Paso del Norte, Tex.....	.....	70,955	6,519,819	6,990,549	6,914,094
Pearl River, Miss.....	268,372	1,064,461	1,687,863	8,393,210	11,368,490
Pensacola, Fla.....	1,930,258	3,451,735	14,413,522	22,644,987	20,505,873
Richmond, Va.....	2,326,915	8,874,998	.....	41,203	26,072
Sabine, Tex.....	.....	.....	.....	20,215,873	23,981,681
St. Augustine, Fla.....	.....	7,193	.....	.....	.....
St. Louis, Mo.....	.....	.....	.....	1,373	2,000
St. Marks, Fla.....	5,062	9,485	6,300	1,125,250	1,016,910
St. Marys, Ga.....	66,151	59,370	4,944	.....	14,974
Saluria, Tex.....	630,587	1,642,104	7,392,110	4,626,250	4,749,619
Savannah, Ga.....	23,992,364	30,884,451	38,251,981	63,428,155	72,076,045
Tampa, Fla.....	.....	1,457,255	4,395,972	.....	5,636,606
Teche, La.....	4,220	15,639	.....	.....	.....
Wilmington, N. C.....	3,941,665	6,934,720	10,975,511	20,922,398	28,812,543
Total.....	\$264,905,753	\$311,742,748	\$484,651,682	\$628,529,790	\$747,822,348
All Districts.....	\$835,638,658	\$857,828,684	\$1,394,483,082	\$1,744,984,720	\$2,049,320,199

Jacksonville was the name given the St. John's, Fla., district in 1911. Newport News, Va., was not made a customs district until 1888. Prior to 1907 Sabine was included in the Galveston, Tex., district. Tampa was created a district in 1887. The Galveston district now embraces Texas City, Tex.; the Pearl River district, Gulfport, Miss., and the Sabine district, Port Arthur, Tex.

South upon the Chesapeake. This eastward tendency of trade was manifest in the older portions of the South and was reflected in railroad projects, including one sixty years ago for a line to the Pacific from some Southern center.

In twenty years up to 1853 the South built 2600 miles of railroads. In the minds of the progressive men of that section at the time railroad building was closely associated with well-defined schemes for the expansion of Southern commerce, one of the most notable of which was that of Dudley Mann, whose proposition of 1856 for a weekly service by steamships between the Chesapeake Bay and Milford Haven on the west coast of Great Britain contemplated an extension and a linking up of railroads in this country so as to bring to tidewater for transportation to Europe the farm products of thirteen States in the South and the West. He expected, moreover, that these railroads would be influential in the utilization for manufacturing, for the benefit of the United States for many centuries, the iron and coal and lead and copper of Virginia, Tennessee and Kentucky.

It was this very call of the South's natural resources for industrial enterprises, practically fallow for twenty years between 1861 and 1881, together with the revival of the South's commercial opportunities, which was responsible for the rapid building of railroads, increasing the mileage of the South between 1880 and 1900 at the rate of 148.8 per cent., while the mileage in the rest of the country increased 95 per cent. This railroad building, most active in the first ten years of the twenty, was precedent to the consolidation of divers lines into such systems as the Southern Railway, the Atlantic Coast Line and the Seaboard Air Line in the southeastern section, and the extension, through building or through gaining control of existing lines, of the facilities of the Illinois Central in the Mississippi Valley. These manifestations were followed by the building of an air-line from Kansas City to Port Arthur, the strengthening of the Southern Pacific centralization at Galveston, the practical creation of the Florida East Coast, the Atlanta, Birmingham & Atlantic, and the Carolina, Clinchfield & Ohio, and the building from the ground up of the Virginian Railway, all of them having an eye to the handling of Southern products for export and all of them increasing the weight of the South in commerce and equipping it for the addition of manufactured goods to its agricultural exports.

Railroad activities, paralleling the Mississippi River with steel rails, brought the flow of much of the trade of the Mississippi Valley back to its natural direction with marked effect upon Southern ports, especially those on the Gulf, as this restoration synchronized with the passing of the center of agricultural production on more than one line to the west of the Mississippi River, and with the consequent appreciation of the advantages of the routes to the Gulf over lake transportation or on railroads across the Alleghenies that had long carried grain and meats for export to the Atlantic seaboard.

For example, of the 5,750,000 bales of cotton of the 1879 crop, 1,960,000, or 34 per cent., were grown west of the Mississippi, but of the 12,120,000 bales of the 1910 crop, 5,265,000 bales, or 44 per cent., were grown west of the Mississippi. Again, in 1880, 1,037,687,000 feet of lumber, or a little more than

5 per cent. of the total cut of the country, were cut in the area embraced in Arkansas, Louisiana, Missouri, Oklahoma and Texas, but the cut of 1909 in those States aggregating 8,648,000,000 feet was nearly 20 per cent. of the total cut of the country. In 1880 five States east of the Mississippi, Pennsylvania, Ohio, Indiana, Illinois and Michigan raised 215,786,000 bushels of wheat, or 43 per cent. of the total American crop of that year, 498,550,000 bushels, and five States west of the Mississippi, Minnesota, Iowa, Missouri, Nebraska and Kansas, raised 136,395,000, or 23 per cent. of the total. In 32 years conditions had become almost reversed, the five States east of the Mississippi producing 145,588,000 bushels, or 22 per cent. of the total crop of 655,516,000 bushels of wheat in 1911, and the five Western States producing 30 per cent. of the total, and with the addition of the Dakotas, 281,553,000 bushels, or 43 per cent. of the total. This change of base in production has been reflected in the exports of foodstuffs at Southern ports, varying in different years, according to variations in crops. For instance, New Orleans increased its exports of flour between 1880 and 1911 from 51,766 barrels to 681,042 barrels; Galveston, from 228 barrels to 323,296 barrels; Mobile, from 246 barrels to 444,177 barrels, and Baltimore, from 453,418 barrels to 894,985 barrels. A sudden expansion in the diversion of breadstuff exports to Southern ports came in the first two or three years of the present century, reaching a point in the calendar year 1903, when these ports handled more than 40 per cent. of the total of such exports and when their value over those of 1902 increased from \$63,751,997 to \$78,038,414, or 22 per cent. at Southern ports, while there was a decrease at all other ports from \$123,629,228 to \$114,881,852, equal to 7 per cent. The greatest increase at the leading Southern ports was from \$9,155,090 to \$19,902,154, or more than 100 per cent. at Galveston, and from \$15,771,271 to \$21,322,056, or more than 35 per cent. at New Orleans.

Meanwhile, the growth in the volume and the value of cotton exports had been accompanied by increases of exports of the products of Southern mines, forests and factories which, with merchandise from other parts of the country, brought the total of exports from Southern districts from \$264,905,753 in 1880 to \$747,822,348 in 1911, and the imports through Southern ports increased in the same period from \$35,906,460 to \$157,311,256.

According to values, of the total \$12,859,839,040 of exports through Southern ports in the thirty-two years, New Orleans handled \$3,598,420,402, or 27.98 per cent.; Galveston, \$2,446,416,271, or 19.02 per cent.; Baltimore, \$2,445,633,199, or 19.01 per cent., and Savannah, \$1,143,612,356, or 8.89 per cent., these four ports handling an aggregate of \$9,634,082,228, or 74.90 per cent. of the total exports of the South and something more than 25 per cent. of the total exports of the country.

Ranking fifth in the South in value of exports in the 32 years is Newport News, Va., with \$419,611,844; Norfolk and Portsmouth being sixth, \$388,863,961; Charleston, S. C., seventh, \$365,069,747; Wilmington eighth, \$347,936,583; Mobile, Ala., ninth, \$339,648,545, and Pensacola, Fla., tenth, \$284,427,891.

In 1911 Galveston ranked first as to exports among Southern ports, with a value of \$220,504,917, New Orleans being second, with \$172,835,293; Baltimore third, \$85,120,843; Savannah fourth, \$72,076,045; Mobile fifth, \$30,154,037; Wilmington sixth, \$28,812,543; Sabine, Tex., seventh, \$23,981,681; Pensacola, Fla., eighth, \$20,505,873; Brunswick, Ga., ninth, \$14,138,847; Corpus Christi, Tex., tenth, \$12,876,106, and Pearl River, Miss., eleventh, \$11,368,490. In 1880 Pearl River exported only \$268,372 of merchandise, and the enlargement of operations there has taken place since 1900 as the result of the upbuilding of Gulfport in the district and the completion of the Gulf & Ship Island Railroad from the coast to the capital of Mississippi contributing to an increase in population of 172 per cent. at Jackson and of 502.4 per cent. at Gulfport in ten years. Up to 1907 the Sabine district was included in Galveston, but in four years its exports increased from \$2,783,689 to \$23,981,681, or more than eight times. But that increase must be credited largely to Port Arthur in that district, the tidewater terminal of the Kansas City Southern Railway—an 800-mile creation.

The greatest actual increase among the Southern ports in value of exports between 1880 and 1911 was from \$16,749,889 to \$220,504,917, or by \$203,755,028 at Galveston. Other large increases were \$82,393,274 at New Orleans, \$48,083,681 at Savannah, \$24,870,878 at Wilmington, \$22,965,279 at Mobile and \$18,575,615 at Pensacola. Exports at Baltimore reached a value of \$115,530,378 in 1900, but last year were \$85,120,843, or about \$8,800,000 greater than in 1880. Charleston is exporting less than half as much as in 1880, and Newport News, which exported \$6,958,369 worth of merchandise in 1890, two years after it had been created a customs district and increased its exports to \$34,758,323 in 1900, is now exporting less than it did twenty years ago. This decline, as also at Baltimore, is largely due to the heavy falling off in the grain exports of the United States. On the other hand, there have been marked advances at Brunswick, Corpus Christi, Fernandina, Paso del Norte, St. Marks and Saluria, while \$2,647,882 exports at Jacksonville in 1911 are to be compared with \$269,611 of St. Johns, as the district was then called, in 1900 and \$88,115 in 1880, and at Tampa, created a district in 1887, the value of exports has nearly quadrupled since 1900.

A number of minor districts of considerable importance before the days of steam navigation and some in the interior, like Richmond, Va., and Georgetown, D. C., have either declined as ports of export, goods shipped from them

in the foreign trade being credited to cities on the seaboard, or they no longer figure in the foreign trade of the country. Building of new railroads and the linking up of formerly independent lines into great systems, giving merchandise an unbroken route from the points of production to those of water shipment, have also had a marked influence in changing the comparative status of several ports as to exports. In 1835 about 18 per cent. of the country's imports entered through Southern ports. Fifteen years later the South's share in the importing movement had become only about 11 per cent. of the total. By 1880 the South was handling but \$36,000,000 of the \$668,000,000 of imports, or slightly more than 5 per cent. That history was marked out as soon as steam navigation determined that the movement of goods from Europe to this country should take the northern route across the Atlantic, and at the same time gave direction to foreign immigration. It was confirmed by the impediments raised against the South by the war and subsequent unrest for ten or fifteen years. In the meantime the opening up and settlement of the great West, bringing tribute to the cities on the Atlantic seaboard outside the South, with the exception, perhaps, of Baltimore, added to their strength as importers. But, with readjustment under way and with imports coming from countries to the south and to the west, Southern ports are regaining their relative positions. Importing but \$35,906,460 in 1880, they received in 1911 more than four times as much foreign merchandise, and their \$157,311,256 of imports was more than 10 per cent. of the total \$1,527,966,105 of the whole country and was an increase of 14 per cent. over 1910 against a decrease of 3.5 per cent. in the value of imports at all other ports of the country.

Values of imports increased between 1880 and 1911 from \$10,611,353 to \$66,-

IMPORTS AT SOUTHERN CUSTOMS DISTRICTS, 1880-1911, BY DECADES.

Customs Districts.	1880.	1890.	1900.	1910.	1911.
Alexandria, Va.....	\$11,845	\$4,600	\$1,325	.....	\$1,200
Apalachicola, Fla.....	300	772	4,725	.....	64
Atlanta, Ga.....	.....	13,751	32,358	\$160,799	252,745
Baltimore, Md.....	19,945,989	13,140,203	19,045,279	29,900,618	32,174,404
Beaufort, N. C.....	1,248	620	.....	.....	.....
Beaufort, S. C.....	28,274	24,354	81,042	.....	.....
Brazos de Santiago.....	1,528,510	330,285	42,446	96,662	216,577
Brunswick, Ga.....	4,958	6,791	17,992	72,578	186,783
Charleston, S. C.....	202,790	646,644	1,124,671	5,228,053	6,216,573
Chattanooga, Tenn.....	.....	.....	2	47,162	51,158
Corpus Christi, Tex.....	453,876	2,606,771	1,626,491	1,960,804	1,481,334
Fernandina, Fla.....	2,157	711	10	105,130	52,839
Galveston, Tex.....	1,094,514	415,792	1,453,545	2,488,006	3,530,945
Georgetown, D. C.....	20,699	257,943	206,730	698,233	837,249
Georgetown, S. C.....	371	.....	.....	.....	.....
Houston, Tex.....	.....	.....	.....	.....	362,566
Jacksonville, Fla.....	938	81,897	22,080	612,600	892,581
Kansas City, Mo.....	.....	449,185	583,018	1,586,202	1,801,872
Key West, Fla.....	490,598	1,100,389	546,460	1,265,645	1,499,285
Knoxville, Tenn.....	.....	.....	3,657	7,520	14,052
Louisville, Ky.....	.....	426,895	341,087	606,848	786,025
Memphis, Tenn.....	.....	85,287	48,240	319,881	275,415
Mobile, Ala.....	425,519	107,015	2,883,934	2,843,350	4,031,737
Nashville, Tenn.....	.....	.....	30,220	94,049	81,738
New Orleans, La.....	10,611,353	14,658,163	17,490,811	55,712,027	66,722,295
Newport News, Va.....	.....	54,180	2,896,828	1,748,191	1,844,947
Norfolk and Ports., Va..	47,057	89,042	251,799	1,523,613	2,078,554
Pamlico, N. C.....	6,749	8,807	3,367	93,773	20,069
Paso del Norte, Tex....	196,804	4,983,197	1,258,565	4,453,689	3,156,024
Pearl River, Miss.....	857	3,892	1,931	88,631	35,757
Pensacola, Fla.....	15,149	22,551	76,458	1,806,202	2,121,314
Petersburg, Va.....	5,381	.....	.....	243,906	251,292
Richmond, Va.....	111,061	61,042	53,832	688,694	998,929
Sabine, Tex.....	.....	.....	.....	70,313	173,815
St. Augustine, Fla.....	1,044	1,486	3,484	6,709	9,833
St. Joseph, Mo.....	.....	154,159	136,831	295,032	203,921
St. Louis, Mo.....	.....	3,087,811	3,760,434	6,317,731	6,025,958
St. Marks, Fla.....	7,376	.....	6	7,794	14,055
St. Marys, Ga.....	10	.....	.....	.....	.....
Saluria, Tex.....	93,989	1,433,072	1,225,304	6,387,235	6,386,846
Savannah, Ga.....	483,802	472,343	430,040	3,855,373	5,296,746
Tampa, Fla.....	.....	506,620	1,235,019	4,422,593	4,018,352
Teche, La.....	12,585	1,005,365	47	.....	.....
Wilmington, N. C.....	100,657	137,061	110,216	2,355,281	3,205,407
Total.....	\$35,906,460	\$46,378,696	\$57,030,284	\$138,170,927	\$157,311,256
All Districts.....	\$667,954,746	\$789,310,409	\$849,941,184	\$1,556,947,430	\$1,527,966,105

722,295 at New Orleans, from \$19,945,989 to \$32,174,404 at Baltimore, from \$47,057 to \$2,078,554 at Norfolk and Portsmouth, from \$100,657 to \$3,205,407 at Wilmington, from \$938 to \$892,581 at Jacksonville, from \$1,094,514 to \$3,530,945 at Galveston, from \$202,790 to \$6,216,573 at Charleston, from \$111,061 to \$998,929 at Richmond, and from \$425,519 to \$4,031,737 at Mobile, like advances being made also at other ports on the coast, as well as at interior cities to which goods are forwarded in bond. Of forty-four districts and ports credited with imports in 1911, all but eight showed marked increases in the value of exports there in 1880 or at later dates when importation began.

Advance already made is but the promise of what is to come in commerce to the South. Because of its possession of the materials for manufacturing, and because some of the materials in other parts of the country have begun to approach the point of exhaustion, the South is bound, in the natural order of things, to gain a stronger and stronger position in industry and to increase the value of its exports by selling to the world finished products instead of the material for their fabrication. It is now mining practically all of the sulphur and phosphate rock and much of the coal and petroleum figuring in exports. More and more its forests are being drawn upon for timber and lumber and naval stores for foreign parts, and it is making most of the cotton goods that are sold abroad. The lines by which the so-called raw materials and the finished products of the South move to tidewater now fairly well define the lines upon which the greater volume of manufactured goods will travel in years to come. There may be increases in some particulars at a few ports and decreases at others, as has happened in the past, but the direction taken by the foreign trade of the country will be more and more toward Southern ports as a whole, and this will apply to imports as well as exports. For the tremendous influence of the Panama Canal will be felt by Southern commerce within a very few years. The South cannot afford to lose a day

in making preparations, both as to furnishing its ever-increasing merchandise for export and as to widening and broadening its facilities from Baltimore all the way around to Corpus Christi for handling most expeditiously the outgoing and incoming freights. Whether it be the ports of the Hampton Roads basin, Wilmington, Charleston, Savannah, Jacksonville, Fernandina, Key West, Tampa, Pensacola, Mobile, New Orleans or Galveston among the older ports, or Southport, Gulfport, Port Arthur, Texas City or Houston among the younger aspirants in Southern commerce, they all must have a share in the development of foreign trade to the south and the west of us within the next decade. Wise men of old in the South had a vision of today and strove to make it a reality more than half a century ago. One of them, perhaps the greatest in broadness of view, practical suggestion and enthusiasm, Mathew F. Maury, expected to see an isthmian canal in operation before 1857. Speaking at an earlier date of that project, he pointed out clearly that from the Gulf of Mexico all the great commercial markets of the world are down-hill and that the establishment of a thoroughfare through the Central American isthmus would compel the whole of Europe to pass our very doors on the great highway to the markets of the East, that from one or the other of the river basins of the Caribbean Sea there is always a crop on the way to market, that that sea had as a back country one continent at the north and another at the south, with a world both to the east and the west, barred only by the Isthmus, and he said:

"Break it down, therefore, and this country is placed midway between Europe and Asia; this sea becomes the center of the world and the focus of the world's commerce."

And the barrier broken, Southern ports are to occupy the very center of that focus.

Intercoastal Canal as a Factor in Commerce



AN important influence in the foreign trade of the country, as well as in its domestic trade, will be the intercoastal waterway planned to connect by a safe route the waters of Massachusetts Bay and the Rio Grande River. A section of this waterway, taking in the rivers and bayous of Louisiana and Texas, has been surveyed for a distance of eight hundred miles between Rio Grande City and New Orleans, and parts of it have been completed. Only in the last week of 1911 announcement was made of preparations by a Texan to form a company for the operation of a fleet of five freight boats between Houston, Galveston and Aransas Pass, and the celebration last fall of the opening of the ship channel between Morgan City, La., and the Gulf brought out the fact that the annual traffic between the Mermentau and New Orleans along the route of the canal and its tributary streams amounts to more than 8,000,000 tons, valued at \$72,000,000.

At the northern end of the proposed waterway the cutting of a canal across Cape Cod, which is now being done by private enterprise, will enable vessels to pass from Massachusetts Bay to Buzzards Bay without encountering the dangers of the Cape Cod coast, one of the great marine graveyards of the world. Between Buzzards Bay and New York Bay no work will be required except in the East River, now under way, to perfect the route to New York, thus facilitating the passage from the South of vast amounts of water-borne cotton, tobacco, coal, lumber, phosphates, naval stores and other products needed in New England.

Across New Jersey is the Delaware and Raritan Canal, 34 miles long, which has been used since 1834, but the people of that State are laboring to have constructed a ship canal connecting the Raritan Bay with the Delaware River, and a commission has been appointed to buy the right of way with the intention of presenting it to the United States Government when the latter shall undertake to build a canal. In 1829 the Chesapeake and Delaware Canal was opened, giving connection between the two bays, and the Chief of Engineers of the United States Army, in his latest report, recommends the purchase of this canal, which now has locks, and its alteration to a tide-level canal with a final depth of 25 feet and with a width of 125 feet at the bottom and 250 feet at the surface.

Early in 1911 was opened a six-mile canal, ten feet deep, between Beaufort Inlet and Pamlico Sound. The Chief of Engineers recommends the deepening of this canal to twelve feet, the construction of a channel between Pamlico Sound and Albemarle Sound by the Rose Bay route, the provisional purchase of the Albemarle and Chesapeake Canal between Currituck Sound and Elizabeth River, near Norfolk, and its conversion into a tide-level canal twelve feet deep. The terrors of Hatteras, another marine graveyard, will thus be obviated, and the Beaufort Inlet cut, in addition to aiding coastwise vessels in avoiding one of the dangers of the Diamond Shoals, shortens the distance between Beaufort and Newbern by 160 miles and connects 3100 square miles of navigable sound waters and 1700 miles of navigable rivers. Hence, its great value to the commercial and industrial development of Eastern North Carolina and its important part to be played in interstate commerce along the Atlantic Coast.

A slight construction will give a protected inland route from Beaufort to Georgetown, S. C., by way of the sounds and inlets of the Carolina, Georgia and Florida coasts, and from that point to Jacksonville, Fla., there are already links in the greater project only requiring deepening to complete it along the Atlantic Coast.

Canalization in Florida already furnishing a stretch 326 miles long, 60 feet wide and 6 feet deep will ultimately be carried out so as to give a route from the St. John's River, near Jacksonville, to Key West. Draining of the Everglades in that State involves the construction of a canal from that region to the east coast, and there are hopes in Florida that the canal will be extended

westward to the Gulf coast. Another link proposed is a canal across the upper part of the State, entering St. George's Sound, and from there on, with some slight excavation, there will be plain sailing to New Orleans by way of St. Andrews, Choctawhatchee, Pensacola and Perdido Bays, in Florida; Mobile Bay, Ala.; Mississippi Sound and Lakes Borgne and Pontchartrain, and there junction will be had with the Texas-Louisiana interstate canal.

Resolutions adopted by the Atlantic Deeper Waterways Association, the organization concentrating the various movements for a deep-water inland channel from Boston harbor to the coast below Cape Hatteras, a distance of more than 600 miles, and the ultimate extension of this waterway to Florida and the Gulf of Mexico, point out that the removal of less than 100 miles of obstructions is needed to assure the waterway from Massachusetts to North Carolina, and presents the following statement:

"Between the years 1900 and 1909 disasters to shipping along the Atlantic seaboard involved nearly 6000 vessels, the loss of 2200 human lives and the destruction of nearly \$40,000,000 worth of property, all of which could have been saved and all future losses prevented by the expenditure of a few million dollars for the opening of an inside deep waterway.

"While one dollar will carry a ton of freight four miles on a dirt-road, ten miles on a first-class stoned road, and one hundred and twenty-seven miles on a railroad, it will carry a ton of freight not less than twelve hundred and fifty miles on the Great Lakes or upon a well-ordered river, bay or deep artificial channel.

"As the taxes for transportation in this country by railway, water and wagon put a burden upon the people of five thousand million dollars a year, or six times the total revenues of the Federal Government, and fifteen times the amount collected from customs at the ports, the question of the reduction of this tax by cheapening the movement of commodities consumed by ninety million people is of the first importance and cannot be neglected without infliction of grave wrong upon the nation.

"It is a circumstance of high importance that the route of this proposed waterway lies along the fruit and vegetable producing regions of North Carolina, Virginia, Maryland, Delaware and New Jersey, and that great reservoir of salt-water food—Chesapeake Bay and its adjacent and tributary waters. The entire region is the market-garden from which the millions of the cities and towns from Boston southward draw much of their sustenance."

Carrying out of this great project dovetails into the improvement of the rivers and harbors of the South, which is steadily progressing. The total navigable length of Southern waterways is more than 17,000 miles. About 11,000 miles of that length are practically within individual State boundaries, and they do not include 1500 miles of the Mississippi River for Kentucky, Tennessee, Arkansas, Mississippi, Louisiana and Missouri jointly; the 652 miles of the Tennessee for Tennessee, Alabama and Kentucky; the 1000 miles of the Red for Louisiana, Arkansas, Oklahoma and Texas; the 518 miles of the Cumberland for Kentucky and Tennessee, the 740 miles of the Arkansas for Arkansas and Oklahoma, the 350 miles of the Sabine for Louisiana and Texas, the 250 miles of the Savannah for Georgia and South Carolina, the 223 miles of the Chattahoochee for Georgia and Alabama, the 217 miles of the Ouichita for Louisiana and Arkansas, the 195 miles of the Escambia and Conecuh for Florida and Alabama, the 116 miles of the Potomac for Maryland and Virginia, the 33 miles of the Choctawhatchee for Florida and Alabama, the 200 miles of the Chesapeake Bay for Maryland and Virginia, the 160 miles of the inland route between Savannah and Fernandina, the 134 miles of connections between the Norfolk basin and the Carolina sounds, the 100 miles of Mississippi Sound, the Chesapeake and Ohio Canal, the James River Canal, the lakes of Florida and smaller bayous and lagoons along the Gulf Coast, especially in Texas.

The Railroad's Potency in Southern Progress



ALTHOUGH it was the birthplace of the railroad in the United States, the Baltimore and Ohio being the first rail common carrier in this country, in transportation development the South at first proceeded slowly as compared with other sections. This was due to the old plantation system under which large tracts of land owned by families or individuals were cultivated and to the general dominance of agriculture as an industry. But in the ten years before the war manufacturing and railroad building made notable advances. Then the great conflict contributed in two ways toward holding back railroads. One was the enforced neglect, while armed forces traversed and fought over the land, and the other the impoverishment of the people of the section, so that for quite a while after the cessation of war there was no apparent inducement for outside capital to step in and reconstruct the lines as well as build others needed to develop the country.

Thirty years ago, in consequence of the conditions described, there were no great railroad systems in the South, notwithstanding that vast areas of rich territory awaited them. Besides, there were not the great aggregations of capital that we have today seeking, yes, almost clamoring for investment. A millionaire was not a common thing then; he was pointed out among his fellow-men, whereas now even the multi-millionaire has ceased to excite comment and to a great degree interest. Therefore, funds did not wait in bank vaults (there were no trust companies then) looking for Southern opportunities; capital could not perceive,—excepting in a very few instances,—that opportunities existed below the Potomac and the Ohio. Therefore only here and there could be found a railroad of any considerable length, and that meant but a few hundred miles.

There was no Southern Railway System, no Atlantic Coast Line, no Seaboard Air Line. C. P. Huntington was just making up the Chesapeake & Ohio by connecting some old roads and building links to make a route from Newport News to the Ohio River, fulfilling part of the dream of Ambrose Mann of 25 years before. This was about the beginning of the movement to consolidate into systems the many small roads throughout the South which were being rebuilt, in many cases with painful deliberation because of their poverty-stricken state. There were different gauges of track to hinder the composition of through lines, although some were operated by changing trucks under the cars at points where the gauges changed from 4 feet 8½ inches (the standard) to 5 feet, or vice versa, according to the direction of the traffic. Rolling stock on most roads was poor and old and the stations small and antiquated. Every line was single track and bridges were rarely aught but perilous wooden trestles. Signalling apparatus was almost unknown. Dispatching was by old-fashioned means, and there were too many of the lines which merited the application of the descriptive phrase of a disgusted shareholder who said that his road consisted of "two streaks of rust and the right of way."

Contrast that condition of railroading in the South with what exists today. Beginning at Washington the traveler finds a magnificent union station that is a splendid ornament to the capital of our country and which takes the places of the miserable and shabby depot that used to stand at the foot of Capitol Hill and the other almost equally dismal and dirty one on the edge of the Mall, several blocks westward. Stretching out from this beautiful new edifice into the great Southern country are two splendid double-tracked lines of heavy steel, over which roll at mile-a-minute speed long and crowded trains of indestructible cars, electrically lighted and heated to summer temperatures in cold weather, yet without a stove in any vehicle, all the warmth coming from the surpluse of steam produced by huge locomotives that make the engines of three decades ago seem like playthings in comparison.

Thus is the best of the comparatively recent past contrasted with the best there is today, and how eloquent of progress and improvement is the picture!

Turning from consideration of the rolling stock to the lines themselves the traveler finds similar degrees of betterment. Everywhere on the roads are evidences of wonderful growth. The entire substructure is wonderfully strong; the heavy tracks rest on stone ballast. Electrically operated signals wig-wag messages of safety to the engineer as the iron horses speed along. In the depot yards both electric and compressed air mechanisms are employed to shift switches and change signals. Communication between stations far and near is frequently made by telephone as well as by telegraph, and in many instances telephone dispatching equipments have entirely taken the places of the telegraphic key and sounder method. Country town stations have comforts and improvements superior to those that used to be found in the city terminals. Through trains no longer halt to let their passengers get a meal; they rush and roar along the line while travelers, comfortably seated in big dining cars, eat in comfort and security as the miles are put behind them. Moreover, the eating-houses are much better generally than they were and serve the travelers who patronize them with considerably greater satisfaction.

The improved service of the railroads is in large part due to the managements having spent great sums for judicious reductions of grades and curves as well as for the building of second track. All this work, especially the latter, is still being pushed whenever possible, but the greater part, it is true, remains to be done. Yet, while most of the main line South is still single track it is substantially constructed for the most part, permitting of high speeds in passenger traffic and heavy loads in freight service. The Southern Railway, the Atlantic Coast Line, the Louisville and Nashville Railroad and the Illinois Central are conspicuous among the companies operating in the South that have turned their attention during the last several years to double tracking and reduction of grades and curves. Many roads have built or are building long passing tracks, or sidings, at frequent intervals which, with trains operated upon carefully arranged schedules and employees maintaining a steadfast devotion to punctuality, afford results equivalent to what is attained on double-track roads having equal amounts of traffic. Upon such lines the making of continuous second track can therefore be accomplished easily and gradually whenever their train movement becomes sufficiently dense to make the use of passing sidings too slow to be continued.

Within the last few years the South has been the scene of some remarkable new railroad construction as well as of the reconstruction and modernizing of old lines. It has witnessed the conception and building of those two notable roads, the Virginian Railway and the Carolina, Clinchfield and Ohio Railroad, which are reckoned among the most, if not the most, modern of all lines so far as train load capacity is concerned. So carefully were their routes chosen and grades established with respect to the coal traffic they were built to carry, that one engine can pull an unusually large number of loaded cars from the mines to the sea. The Clinchfield is conspicuous as a pathway, easy and safe, amid the peaks of the Blue Ridge in Western North Carolina, where it

was once thought that railroading was impossible because of the rough country. These lines were built up to modern standards at their birth, heavy track and heavy equipment being provided to do the arduous work for which they were designed.

But the recent construction of the Florida East Coast Railway on to Key West is the greatest marvel of railway construction in the South, and in some respects probably in the world. Thirty years ago the man who uttered dreams of making a railroad to the little isle away out in the Gulf of Mexico would have been classed among the demented, yet such a line now exists. Henry M. Flagler, who projected and executed this "over-the-sea railroad," as it has been termed, was then a director of the old Jacksonville, Tampa and Key West Railway, and maybe he had ideas of getting a line of rails to Key West some day, yet if he did he said little of them and Titus-

ville was the farthest south in the ken of his company. There was no line down below there on the beautiful Indian River, no Palm Beach, no Miami with steamers to the tropics, no anything except a vast stretch of primeval country with some small villages along the rivers where river trade was possible.

But now the line of steel stretches far, far southward, 535 miles from Jacksonville to Key West. Not far below Miami it leaps from the mainland to the first, and largest, of the islands and then, now on land and now over the water, it makes its way to its Gulf terminal, only 90 miles from Havana, which it is proposed to reach by a railroad ferry boat carrying either single cars or entire trains. There is also a branch building down to Lake Okeechobee. Truly, the South can point to this achievement as one of the world's wonders.

But, if Florida was only very partially developed with respect to railroads at the beginning of the period under consideration, what shall be said of West Virginia. With the exception of the Baltimore and Ohio and the Chesapeake and Ohio main lines it was almost wholly without railroads. The beginning of the West Virginia Central was to be seen in the Piedmont and Cumberland, and the West Virginia and Pittsburgh ambled down from the B. & O. towards Buckhannon, but of the other lines that now traverse this State of mountains there was hardly a trace. When some timber or coal was to be reached a branch was built, generally in a primitive sort of way,—from one of the very few existing roads,—to carry it out to market, but if such natural wealth lay distant from the main highway it was almost as impossible to realize upon as if it lay in the heights of the Himalayas. The country was in a wild state, as primitive in many parts as the Far West, for, owing to its physical obstacles to railroad building, and to its prevailing topography that permitted the use of comparatively little land for agriculture, mining and lumbering were the chief industries, particularly the latter, for, in lieu of railroads, the logs could be tumbled down the mountain sides into the streams, and rafted away to market.

Although in such a region of hills and valleys lumbermen often found it difficult to obtain railroad facilities for their products, the lumber companies in the rolling or level country of States farther South more frequently played an important part in providing railroad facilities not only for themselves, but for

INCREASE IN SOUTHERN RAILROAD MILEAGE.

States.	1880.	1890.	1900.	1910.	1911.
Alabama	1,843	3,422	4,197	5,176	5,270
Arkansas	859	2,203	3,109	5,034	5,150
Florida	518	2,490	3,256	4,727	4,942
Georgia	2,459	4,601	5,730	7,196	7,304
Kentucky	1,530	2,942	3,094	3,726	3,851
Louisiana	652	1,740	3,801	5,234	5,317
*Maryland	1,040	1,391	1,364	1,588	1,609
Mississippi	1,127	2,471	2,934	4,234	4,262
Missouri	3,965	6,142	6,887	8,071	8,143
North Carolina	1,486	3,128	3,733	5,299	5,424
Oklahoma	289	1,261	2,399	6,106	6,250
South Carolina	1,427	2,289	2,919	3,330	3,427
Tennessee	1,843	2,767	3,185	4,004	4,070
Texas	3,244	8,710	9,992	15,070	15,495
Virginia	1,893	3,360	3,795	4,609	4,635
West Virginia	691	1,433	2,485	3,680	3,754
Total	24,866	50,350	61,880	87,084	88,903
United States	93,262	166,703	194,321	245,000	250,000

*Includes District of Columbia.

the public. In every Southern Commonwealth where large bodies of merchantable timber were to be found the lumberjacks established themselves here and there with tramways, crazy little railroads that often wriggled an uneasy and somewhat perilous way,—frequently upon the ungraded surface of the ground,—into the woods for hauling out with wheezy little engines and rickety cars the felled kings of the forest. The better located of these roads were destined to be common carriers. Settlements, which grew into villages, developed along them and one after another the main lines became public railroads, while the spurs, trailing away snakelike from the trunk, were taken up and transplanted to new fields of usefulness as one by one timber tracts were cut and the land left bare, excepting for brush and small timber, some of the clearings to become farms and others to be again cut over when the remaining trees had come to a size fit for use.

Eastern Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky, Tennessee, Arkansas, Louisiana and Texas have benefited in large part by the building of lumber railroads, some of the lines, it is true, planned from their beginnings to eventually be avenues of general transportation, but many others coming to that condition through a succession of circumstances such as are here described.

The Norfolk Southern Railroad is a prominent example of several lumber railways being combined into a system for public service. Less than ten years ago it was disjointed and scattered; now it is united with over 600 miles of line, to which have been recently added 225 miles, in connection with which latter it is planned to do considerable construction. About 500 miles of the original trackage are in the eastern part of North Carolina, the main line dropping down from Norfolk to New Bern, Raleigh, Goldsboro, Beaufort, Belhaven, Columbia and other points are reached by branches, these particulars being necessary to show how useful lumber railroads became when wisely combined. The erection of a long bridge across Albemarle Sound (5½ miles) was a feature in the composition of this system.

The New Orleans, Mobile and Chicago Railway (formerly the Mobile, Jackson and Kansas City Railroad) is another lumber railroad that has lately come into prominence by the announcement that the Frisco and the Louisville and Nashville systems have become jointly interested therein with the purpose of extending it both north and south to connect with each system and make it a railroad highway for another direct route between Chicago and New Orleans.

How the railroads of the South have been otherwise extended and improved may be realized by reference to the line improvements and double tracking of the Chesapeake & Ohio and the Norfolk & Western. The latter made quite a diversion of line in West Virginia to get a better through route into Ohio, and it joined with the Atlantic Coast Line in the construction of a new railroad from Winston-Salem to Wadesboro, N. C., 90 miles, each company benefiting extensively by this new link.

Conspicuous also is the work of the Louisville & Nashville, that is now engaged upon the construction of two important coal roads in the eastern part of Kentucky, one of them 100 miles long and the other, including branches, being not much less in length. The same company is also embarked upon the building of an entirely new route for a considerable portion of its main line between Nashville and Birmingham.

Other comparatively late construction is the building of the Illinois Central's line to reach Birmingham, where it meets the Central of Georgia Railway that has become, through it, one of the Harriman roads. The Atlanta, Birmingham & Atlantic Railway is another new avenue of traffic that did not exist until a very few years ago. Going farther back we saw the Seaboard Air Line get to Atlanta and then to Birmingham, besides having absorbed the Florida Central & Peninsular road in Florida, which took it down to Tampa. The same system also obtained its own line from Weldon to Richmond by a well-timed piece of construction after having been obliged to use the tracks of a competitor between those points. The "Sam" road (Savannah, Americus & Montgomery; afterwards the Georgia & Alabama) was also taken into the system, which obtained other lines here and there.

The Atlantic Coast Line absorbed the Plant System, thus going into Florida and away down the west coast, along which it is now planning some new construction (about 100 miles), which will afford it an excellent route to points in Western Georgia, Alabama and beyond. Then there was the upbuilding of the Southern Railway out of the ruins left by the failure of the Richmond Terminal & Warehouse Co. The result of that reorganization has placed about 7000 miles of railroads under the control of one company whose sphere of influence is constantly growing.

This expansion of the Southern reminds one of the important steps taken by the Atlantic Coast Line interests when they bought control of the Louisville & Nashville System several years ago. Thus the Coast Line, while not operating the acquired system, gains a much stronger position in the railroad world through this control, and it incidentally controls, through the L. & N., the Nashville, Chattanooga & St. Louis Railway. Because of the eastward extensions of the L. & N. to open up Kentucky coal lands, the prospect of its connection with the Coast Line by a line to the Norfolk & Western (with which the latter has intimate relations) becomes brighter and is expected.

While these remarks upon recent progress of railroad construction, merging and other changes of control may seem not altogether pertinent in a review of railroading in the South that is supposed to contrast the present with the past of the early eighties, they are of value in directing the reader's attention to the fact that processes of like nature have been at work more or less actively during the entire period of thirty years that has elapsed.

The routine has generally been like this: First construction by individuals, firms or independent companies, the work mostly being of light construction. Next improvement to raise the line to a higher plane of efficiency, this step being preceded or followed by purchase or absorption into a system. This process continues today. The building of lumber and mineral roads proceeds as before and, as they become more valuable, the main lines from which they

diverge annex them. Thus bit by bit trunk lines and systems are composed. Some lines of importance are conceived by shrewd observers and built only to be sold. Perhaps systems into which they finally gravitate are not ready to build them and are content to use their capital for something more desirable at the time, letting outside money do the work and afterward reap a profit perhaps in the deal by which the road goes into a system.

One of the wonderful developments since 1881 has been the establishment of a railroad center at Birmingham, which, by the way, is one of the Southern cities which have lately acquired modern union stations. Birmingham was just being heard of when the Manufacturers Record was in its swaddling clothes; it was a new town on the map. It is now the most prominent railroad point in Alabama; a city of liberal dimensions that is growing fast. Much of its progress is owing to what the railroads have done there. And they are doing more all the time, one of the latest things being the construction of a high-speed electric railway throughout the Birmingham district, one which is to reach deep water at Tuscaloosa, with river connections to the Gulf.

Passing over intervening States for the time being, let us note what has been doing in that greatest in area of all the States—Texas. In 1881 the Lone Star State was apparently bigger as to land than she is now because she was so poor in railroads. There was a sprinkling of them in the eastern and northern portions, reaching such points as Denison, Dallas, Fort Worth, Waco, Austin, Houston and Galveston, but in the vast western half of the State there was nothing but the Southern Pacific road to El Paso and the Texas & Pacific, which was under construction from Fort Worth. Between these two lines and to the northwest lay great stretches of the plains to which the puff of the locomotive was as unknown as to the fastnesses of Central Africa.

How that country has filled in with ties and steel since then! The Fort Worth & Denver City, the Santa Fe, the Texas Central, the Frisco, the Wichita Falls, the Rock Island and other companies have all gone in there upon the once "boundless plains" and criss-crossed the land with their tracks. The process is continuing and a long trunk line, the Kansas City, Mexico & Orient Railway, has finished most of its line down from the Red River to its proposed crossing of the Rio Grande on its way through Mexico to the Pacific. Another trunk line is that of the Santa Fe, which has just been finished, making a direct route between the Gulf of Mexico and the Pacific.

Several years ago saw the Trinity & Brazos Valley Railway built; it is now part of the Colorado Southern Lines, taking that system down to the Texas coast, and now there is another road, the Missouri, Oklahoma & Gulf, on its way southward through the big Commonwealth, having lately reached Denison from its beginning in Oklahoma. The action of the Frisco in getting down into the Brownsville country must not be forgotten. The line was built as the St. Louis, Brownsville & Mexico Railway and later was merged into that part of the Frisco System called the New Orleans, Texas & Mexico Railroad, running out of New Orleans, and including the Colorado Southern, New Orleans & Pacific and the Beaumont, Sour Lake and Western Railways as part of its property. The development of the southern extremity of Texas as a result of the construction of this road is a highly important part of the State's transportation history.

Texas promises to be a prominent field for interurban railways. The line between Dallas and Fort Worth was built seven or eight years ago and was followed by the construction of another electric railway from Dallas to Denison and Sherman. The latest of this type of road to be completed is the Galveston-Houston line that began operating in December. Construction of an electric road from Dallas to Waxahachie, 30 miles, is progressing and it may be extended 13 miles more to Ennis. A number of other traction plans of importance are being pushed. But the Texas railroad field is vast. She is an empire in her dimensions and there is a tremendous amount of work to be accomplished ere her needs for transportation facilities will be anywhere near completion.

Stepping back a bit into Louisiana and Arkansas, and even Missouri,—for the latter is closely identified with the South,—we find wonderful advancement within thirty years. In the eighties the main lines of railroad in these States resembled those in some other portions of the South in that they were as shadows preceding conditions which were to come. Generally of light construction (light even in those days of light equipment) they permitted only very moderate speeds. There was no line south to New Orleans west of the Mississippi. Texas was the goal southwest and Kansas City, Denver and San Francisco to the west. The tracks stretched out slenderly from St. Louis in the directions indicated by these names, but there was little else in the way of railroad. Since then we have seen the building of the Kansas City, Pittsburgh & Gulf (now the Kansas City Southern); and the Missouri Pacific's low grade route down along the big river and this line is now being improved and extended to afford greater and better service. Then there is the Choctaw, Oklahoma & Gulf Railroad, now in the Rock Island System, and sundry other lines crossing and recrossing the three States, including the Edenborn road—the Louisiana Railway & Navigation Co.'s line, that comparatively recently got into New Orleans and which is the Frisco route into that city. The New Orleans Great Northern Railroad is another enterprise prompted by lumber development. It goes to Jackson, Miss., and may be extended north of that city.

But why particularize. Every State has its own especial railroad history and retracing our steps to Maryland, the very natal spot of railroads in America, we find the Western Maryland finishing up an extension northwest from Cumberland, the effect of which will be to make it an eastern outlet for the Vantertilt trunk lines, especially from the Pittsburgh District. This is one of the most notable strokes of railroad enterprise that the country has witnessed. A few years back the Western Maryland was a tiny system of about 250 miles of track in Maryland and a few counties in the Southern part of Pennsylvania. Baltimore had a large share in its stock, having contributed liberally to its construction for the purely local purpose of retaining for its merchants and manufacturers trade in the western counties which would have drifted elsewhere.

But George J. Gould, who still has a large interest in the line, and his associates, saw that the Western Maryland, which had valuable rights in Baltimore, could be made a trunk line terminal route and they bought control for about \$8,000,000, their avowed purpose being to construct a connection with the Wabash Railroad that Joseph Ramsey, then one of Gould's lieutenants, was building into Pittsburgh. They first built an extension to tidewater at Baltimore and another of about 65 miles, to Cumberland, Md., 200 miles west of the Chesapeake. But the Wabash was strapped financially after it completed its expensive high line into Pittsburgh and was unable to proceed east of that city but the value of the Western Maryland to the New York Central Lines, tremendous traffic producers, and which already reached far south of Pittsburgh in Pennsylvania, did not escape notice, other financiers were speedily interested and a long traffic agreement and the construction of the Connells-ville extension were realized. This gives the South another trunk line between Chicago and the Atlantic Ocean.

Conspicuous among the manifold betterments that the railroads of the Southern States are enjoying are the modern passenger terminals erected in several cities, including (besides Washington, to which reference is made at the beginning of this article), Atlanta, Savannah, Birmingham, Mobile, New Orleans, Houston and St. Louis. A huge Union Station is also being built at Kansas City, which was a raw railroad town thirty years ago, but is now one of the great intersecting points of Western lines.

As for important freight terminals there are many, especially on the coast, all the way from Baltimore to Galveston. Great coal shipping facilities have been provided at many ports, for instance the piers at Baltimore, Newport News, Norfolk and other places, besides additional handling apparatus that is being provided here and there every little while. Wilmington, Charleston, Savannah, Brunswick, Fernandina, Jacksonville, Tampa, Pensacola, Mobile, Gulfport, New Orleans, Port Arthur and Galveston are all growing, the latter especially having accomplished wonderful gains. There also appears to be in sight the realization of a great coal port at Southport, N. C., which has

just obtained a railroad and which enjoys a natural depth of water in the harbor sufficient for very large steamers, so that it could be easily made to accommodate the very largest craft upon the seas. Port Aransas, Tex., is approaching completion of its facilities and will soon be ready to offer their use to the world's shipping in connection with its terminal railroads now being built.

Inland we find greater freight terminals at such points as Louisville, St. Louis, Memphis, Birmingham, Atlanta, Montgomery, Richmond, Nashville, and in fact at every important city, the reports received daily by the Manufacturers Record showing that the work of enlargement and improvement never ceases; there is never a time when a railroad company can say with respect to any prominent terminal, "It is complete."

The trend of railroad construction in the South at present is toward the Gulf and it is likely to continue so indefinitely. The opening of the Panama Canal, which is promised within a year or two, has a tremendous influence upon the transportation field. Everyone interested is looking to provide adequate facilities at some port on the Gulf of Mexico. The recent acquisition of the New Orleans, Mobile & Chicago Railroad by the Frisco and the Louisville & Nashville systems is only one of many indications of the aims of railroad planners and builders. The control of the Central of Georgia Railway by the Illinois Central is also expected to result in obtaining a Gulf outlet for it somewhere in Florida or Alabama and the desired object may be reached at almost any time. There are several new roads built or building down to the Gulf in the several States on its shores and a change of ownership of one or more of them is something to be expected. In connection with this work we will see more double tracking of existing lines, more building up of lightly constructed roads into lines capable of carrying the heaviest trains, more purchases of heavier and better equipment and the development of terminals that are now thought of only in visions of the future. In all this construction present and to be exists the evidence clear and distinct that the greatest railroad development the South has ever known is to come within the next few years.

Great Expansion in Southern Banking Facilities



WO thousand National banks in the South in 1911, only ninety-five less than the number in the whole country in 1880 and nearly nine times as many as the South had in that year, is a striking fact in the record of the increase in the banking facilities of that section.

In thirty-one years the resources of its National banks have increased more than nine times, their capital more than four times, and the amount of their individual deposits more than thirteen times, while the amount of deposits in its other financial institutions have increased more than ten times.

Such deposits in its National banks are greater by \$83,890,873 than the total in all the National banks of the country in 1880, and the aggregate individual deposits in all financial institutions of the South are within \$50,000,000 of the aggregate of those in the country thirty-one years ago.

specie held by banks in the country, Southern banks held \$35,740,561. New York led the country with \$20,921,545, but Louisiana ranked second with \$12,115,431, nearly \$4,000,000 more than Pennsylvania and \$5,500,000 more than Massachusetts. Force of habit and convictions turning upon views of the Constitution operated to make the South slow to adopt the National banking idea, but once the impetus was given and as industrial development called for greater facilities, the habits and prejudices were overcome, and compared with the population the South is today better equipped as to National banking than the whole country was in 1880.

Characteristic of the development of financial institutions generally in the South was the growth of deposits in State, savings and private banks and loan and trust companies in that section. In 1880 such institutions in every State except North Carolina, South Carolina and Tennessee had larger individual

DEPOSITS IN SOUTHERN STATE, SAVINGS AND PRIVATE BANKS AND LOAN AND TRUST COMPANIES.

States.	1880.	1890.	1900.	1910.	1911.
Alabama	\$2,269,647	\$1,937,377	\$4,588,607	\$20,547,521	\$36,505,913
Arkansas	577,628	1,107,743	4,597,891	21,510,290	31,553,892
District of Columbia	3,305,875	1,303,717	11,605,576	35,552,021	37,769,258
Florida	287,289	852,739	3,714,831	20,836,759	24,180,049
Georgia	5,910,827	14,205,711	22,260,235	43,798,472	66,260,782
Kentucky	13,501,787	27,500,082	34,044,105	70,000,736	69,857,208
Louisiana	4,719,465	8,915,011	15,968,225	71,104,932	77,373,300
Maryland	26,634,263	39,094,334	69,395,411	152,259,641	157,288,130
Mississippi	2,634,915	4,321,263	12,547,103	32,024,735	55,046,343
Missouri	33,995,915	68,007,841	88,660,622	273,873,551	284,396,763
North Carolina	1,596,632	3,367,909	9,280,798	41,239,789	45,595,830
Oklahoma		129,611	3,703,784	45,734,947	39,683,943
South Carolina	658,812	4,842,368	8,774,786	35,965,325	40,788,447
Tennessee	3,222,740	9,088,121	10,957,562	41,189,443	51,072,122
Texas	6,332,751	5,839,967	12,934,634	43,533,095	56,408,457
Virginia	7,757,202	13,767,424	22,451,581	50,753,079	49,765,561
West Virginia	4,034,743	3,938,249	21,317,823	56,814,265	60,499,951
Total	\$117,440,491	\$208,219,467	\$346,803,574	\$1,056,738,601	\$1,184,045,949
United States*	\$1,319,094,576	\$2,514,077,249	\$4,780,893,692	\$9,996,179,942	\$10,428,283,554

*Includes island possessions, 1910 and 1911. †Excluding State banks in 1900.

Strengthening of the South's banking position, most notable during the past ten or twelve years, has come about as a natural consequence of the general progress of that section and has been a tremendous factor in furthering that advancement. The beginning in 1880 was almost a new creation. What banking capital the South had in 1860, and it was only \$118,661,912, had been swept away by the war, and in rebuilding it was necessary not only to recoup from this loss and from the greater burdens of the rapine of reconstruction, but also to overcome quite deeply-seated prejudices in large portions of the South against banking institutions. The intimate relations between a number of States and banks in the first half of the last century resulted in widespread distrust following the panic of 1837, and more than one State made constitutional provision against banks, but gradually this feeling was modified until in 1860 five or six of the States had good banking systems with features afterward incorporated in the National banking act, and of the \$83,564,528 of

deposits than the National banks within their boundaries, the former in the whole South having \$117,440,491 and the latter \$73,124,523, a difference of \$44,315,968. In the whole country the individual deposits in National banks amounted to \$873,537,637, and in other financial institutions to \$1,319,094,576, a difference of \$445,556,939. By 1890 these deposits in National banks in the South had become greater than in other institutions there, but since then, with the rise in leading cities of trust companies engaged in banking operations, the trend in the South has been the same as in the rest of the country, and in 1911 individual deposits in National banks amounted to \$957,428,510 as against \$1,184,045,949 in all other financial institutions, and in the rest of the country these deposits in National banks amounted to \$4,578,613,771, compared with \$9,244,237,605 in other financial institutions. Between 1880 and 1911 individual deposits in State, savings and private banks and loan and trust companies in the South increased from \$117,440,491 to \$1,184,045,949, or by \$1,066,605,458,

equal to 908.1 per cent. in the South, and in the rest of the country from \$1,201,654,085 to \$9,244,237,605, or by \$8,042,583,520, equal to 669.3 per cent., while deposits in National banks increased from \$73,124,523 to \$957,428,510, or by \$884,303,987, equal to 1209.3 per cent. in the South as against an increase at the rate of 472.3 per cent. in the rest of the country.

While the increase in the capital of National banks in the rest of the country in the thirty-one years was about twice as great as the increase in such capital in the South, the increase in the South of \$182,964,920, from \$53,888,930 to \$236,853,850, was at the rate of 339.5 per cent., about three and one-half times as great as the rate in the rest of the country. Texas led all of the Southern States in the increase in this capital, with \$47,710,600; Missouri being second, with \$28,790,000; Virginia third, with \$13,777,500; Georgia

NATIONAL BANKS IN THE SOUTH.

1880.

States.	No.	Aggregate Resources.	Capital.	Individual Deposits.
Alabama	9	\$5,036,764 01	\$1,508,000	\$1,318,889 16
Arkansas	2	779,490 87	205,000	265,382 21
Dis. Columbia.	6	5,091,550 03	1,507,000	2,154,594 72
Florida	2	312,334 79	100,000	157,202 80
Georgia	13	7,849,727 42	2,221,000	2,012,457 02
Kentucky	49	33,333,221 28	10,146,500	8,510,630 03
Louisiana	7	13,255,603 59	3,475,000	6,013,172 81
Maryland	35	50,858,354 84	13,222,030	21,431,763 42
Mississippi		(2 in liquidation.)		
Missouri	21	22,620,287 00	7,200,000	8,391,274 00
North Carolina	15	8,420,060 26	2,501,000	2,883,365 80
South Carolina	12	7,827,603 72	2,451,100	2,586,176 72
Tennessee	23	13,390,626 98	3,005,300	6,588,048 28
Texas	13	5,021,016 43	1,420,000	2,080,993 03
Virginia	17	14,348,362 51	3,066,000	6,690,447 27
West Virginia.	17	5,939,454 83	1,861,000	2,040,126 05
Total	241	\$194,084,458 56	\$53,888,930	\$73,124,523 32
United States..	2,095	\$2,105,786,626 00	\$466,365,085	\$873,537,637 00

1890.

States.	No.	Aggregate Resources.	Capital.	Individual Deposits.
Alabama	30	\$15,866,694 00	\$4,294,000	\$7,024,636 00
Arkansas	9	5,526,862 00	1,530,310	2,235,091 00
Dis. Columbia.	12	15,630,449 00	2,627,000	10,626,082 00
Florida	15	5,603,848 00	1,150,000	3,363,953 00
Georgia	30	15,985,846 00	3,906,000	6,334,808 00
Kentucky	76	48,962,867 00	14,853,500	17,188,664 00
Louisiana	19	27,999,264 00	4,325,000	14,783,880 00
Maryland	59	61,486,309 00	15,653,750	30,955,946 00
Mississippi	12	4,641,451 00	1,140,000	1,805,955 00
Missouri	79	100,428,159 00	22,160,670	45,011,219 00
North Carolina	21	10,025,041 00	2,656,000	4,673,294 00
Oklahoma	5	617,846 00	310,000	229,355 00
South Carolina	16	9,724,683 00	1,798,000	3,511,123 00
Tennessee	51	34,847,582 00	9,773,240	15,121,303 00
Texas	189	71,948,401 00	22,227,260	30,449,724 00
Virginia	32	24,751,895 00	4,236,300	14,309,039 00
West Virginia.	21	9,232,291 00	2,176,000	5,262,209 00
Total	676	\$463,279,488 00	\$114,817,030	\$212,886,281 00
United States..	3,540	\$3,141,487,495 00	\$650,447,235	\$1,564,845,175 00

1910.

States.	No.	Aggregate Resources.	Capital.	Individual Deposits.
Alabama	80	\$60,535,285 00	\$8,750,000	\$32,911,447 00
Arkansas	45	30,294,004 00	4,155,000	15,312,911 00
Dis. Columbia.	12	48,703,301 00	6,052,000	23,402,653 00
Florida	43	46,183,821 00	5,760,000	26,086,580 00
Georgia	115	92,690,047 00	13,314,240	44,941,972 00
Kentucky	149	113,003,541 00	17,616,360	54,726,391 00
Louisiana	30	69,191,784 00	8,086,500	31,374,574 00
Maryland	109	158,439,722 00	18,582,160	77,790,163 00
Mississippi	32	23,768,395 00	3,415,000	12,768,304 00
Missouri	129	377,602,495 00	35,305,000	143,758,257 00
North Carolina	75	55,155,374 00	8,010,000	26,268,062 00
Oklahoma	228	81,816,929 00	10,692,500	45,767,788 00
South Carolina	41	37,326,768 00	5,022,500	18,310,939 00
Tennessee	101	96,615,971 00	11,895,000	52,080,802 00
Texas	520	333,999,904 00	44,206,000	175,959,283 00
Virginia	126	132,766,631 00	15,743,500	73,652,398 00
West Virginia.	103	72,001,259 00	9,092,470	44,091,084 00
Total	1,938	\$1,830,095,231 00	\$225,698,230	\$899,203,608 00
United States*	7,204	\$9,956,476,831 00	\$1,004,288,107	\$5,304,788,306 00

*Includes island possessions.

gia fourth, with \$11,735,000, and Tennessee fifth, with \$9,429,700, Oklahoma increasing this capital between 1890 and 1911 by \$12,870,000. Florida had the greatest rate of increase, 592.18 per cent.

In aggregate resources of National banks in the South there was an increase from \$194,084,459 to \$1,925,184,627, or by \$1,731,100,168, equal to 891.9 per cent. Missouri led in the increases with \$370,159,446, Texas being second, with \$335,208,067; Virginia third, with \$137,583,163; Maryland fourth, with \$111,858,710, and Georgia fifth, with \$89,126,074. The \$89,779,911 increase in Oklahoma after 1890 was at the rate of 14,531.1 per cent. and Texas' increase in thirty-one years was at the rate of 6676.1 per cent. The increase both in Texas and Missouri was greater than the aggregate resources of the whole South in 1880.

In increases in individual deposits, Texas led the South, with \$176,841,036, and was followed by Missouri, \$136,449,539; Virginia, \$77,963,197; Maryland, \$60,435,629, and Kentucky, \$48,966,880. As in the other items, and explainable, of course, by the fact of the small basic amounts in 1880, the rates of increase in deposits were enormous, Florida showing 18,924.5 per cent., Texas,

8497.9 per cent.; Arkansas, 6080.6 per cent.; Alabama, 2618.9 per cent.; Georgia, 2240.9 per cent., and West Virginia, 2197.2 per cent.

Accompanying such rates of increase were shiftings in the relative rank of the several States and in National banks. In the amount of capital, aggregate resources and individual deposits, Maryland ranked first in 1880, but by 1911 it stood third in aggregate resources and capital and fourth as to individual deposits. Kentucky ranked second as to all three items in 1880, but in 1911 was fourth as to capital, fifth as to aggregate resources and sixth as to deposits. Missouri stood third as to all items in 1880, but first in aggregate resources in 1911 and second in both capital and individual deposits. Virginia has held fourth place in aggregate resources and fifth place in capital, but has moved from fourth place to third in

1900.

States.	No.	Aggregate Resources.	Capital.	Individual Deposits.
Alabama	28	\$19,055,380 87	\$3,480,000	\$10,938,390 23
Arkansas	7	5,244,680 48	1,070,000	3,102,315 55
Dis. Columbia.	12	26,205,244 17	3,027,000	18,210,911 09
Florida	16	9,642,703 02	1,155,000	6,435,441 14
Georgia	29	23,563,135 83	4,306,000	10,864,848 52
Kentucky	81	65,758,544 68	12,842,595	27,755,375 82
Louisiana	21	33,526,484 94	3,285,000	20,308,027 80
Maryland	72	96,669,395 99	15,122,660	42,941,480 88
Missouri	67	179,746,530 00	17,950,000	64,448,555 00
Mississippi	12	6,557,164 35	980,000	3,878,626 52
North Carolina	31	15,362,182 15	3,043,500	7,477,057 97
Oklahoma	54	9,283,028 00	2,181,990	5,262,842 00
South Carolina	17	11,934,975 70	2,083,000	5,171,643 71
Tennessee	50	41,213,509 39	7,337,645	22,082,775 00
Texas	223	97,763,442 31	19,618,920	49,749,108 63
Virginia	43	39,058,368 03	5,171,000	20,473,458 43
West Virginia.	40	25,242,824 47	3,849,660	15,548,822 68
Total	803	\$705,827,594 38	\$106,503,970	\$334,649,680 97
United States..	3,871	\$5,048,138,499 29	\$630,299,031	\$2,508,248,557 53

1911.

States.	No.	Aggregate Resources.	Capital.	Individual Deposits.
Alabama	83	\$65,109,958	\$9,503,870	\$35,859,233
Arkansas	48	30,805,729	4,510,000	16,209,712
Dis. Columbia.	11	49,894,056	6,102,710	24,253,024
Florida	45	51,602,027	6,021,860	29,907,071
Georgia	115	96,975,802	13,956,000	47,111,137
Kentucky	144	117,170,275	17,475,900	57,477,510
Louisiana	32	78,091,924	8,145,000	38,987,786
Maryland	107	162,717,065	17,582,410	81,867,392
Mississippi	30	23,528,270	3,230,000	12,806,740
Missouri	133	392,779,733	35,990,000	144,840,813
North Carolina	73	57,708,716	8,185,000	28,558,540
Oklahoma	281	90,397,757	12,870,000	52,540,556
South Carolina	44	38,504,212	5,510,000	18,594,088
Tennessee	100	102,057,851	12,435,000	57,972,579
Texas	516	340,229,084	49,130,600	178,922,029
Virginia	130	151,931,526	16,843,500	84,653,644
West Virginia.	108	75,680,642	9,362,000	46,866,656
Total	2000	\$1,925,184,627	\$236,853,850	\$957,428,510
United States*	7328	\$10,443,457,106	\$1,026,440,500	\$5,536,042,281

*Includes island possessions.

individual deposits. Tennessee has held fifth place in individual deposits, but has moved from fifth place to sixth in resources and from sixth place to eighth in capital. A study of the changes among the other States reflects in a striking way the developments in those States on various material lines.

The great increase in National banking in the South has occurred since the passage of the act of 1900, permitting National banks to be organized with \$25,000 capital, the increase in resources since then being 70 per cent. of the total increase since 1880, in capital 71 per cent. and in individual deposits 70 per cent. of the total increases in those lines.

As to increase in individual deposits in financial institutions other than National banks, Missouri has led with \$250,400,848, Maryland being second, with \$130,653,867; Louisiana third, with \$72,653,835; Georgia fourth, with \$60,349,955, and West Virginia fifth, with \$56,465,208. The vast aggregate of more than \$2,100,000,000 in individual deposits in financial institutions of the South is about one-fourteenth of the wealth of the South today, and the increase in such deposits is a little more than 7 per cent. of the increase in thirty-one years in the true wealth of the South which it indicates.

Where Crops of Every Kind Enrich the Grower



VERY crop needed for man's food and every direct or indirect product of agriculture needed for his clothing can be raised in the South. In that favored section practically every crop of the country can be raised in addition to other crops which cannot be grown elsewhere. It is the section steadily adding to its importance as the great market garden of the United States.

Thirty-four per cent. of the farm products of the country were credited to the South in 1880, the amount being \$756,000,000 in a total of \$2,213,000,000. Of the total value, or \$4,547,554,000, of twelve leading crops raised in the country in 1910, something more than 41 per cent., or \$1,977,260,000, was credited to the South, and that amount was about 63 per cent. of that section's agricultural production.

Between 1880 and 1910 the area of improved farm land in the South increased from 101,975,175 acres to 173,982,000 acres, or by 72,006,825 acres, equal to 70.6 per cent., and in the rest of the country from 182,795,867 acres to 303,466,000 acres, or by 120,670,133 acres, equal to 66 per cent.

In the same period the value of farm lands and improvements more than quadrupled in the South, while trebling in the rest of the country, the actual increases being from \$2,212,173,481 to \$8,971,083,000, a gain of \$6,758,909,519, or 353.7 per cent. in the South, and from \$7,984,923,295 to \$25,710,424,000, a gain of \$17,725,500,705, equal to 221.9 per cent. in the rest of the country.

Agricultural progress in the South has been remarkable in the past 30 years, and the more so because of the appalling difficulties in the way of the beginnings of that progress. For, the strain upon the South between 1870 and 1880 was in some respects greater than that in the ten years including the war period.

In the early seventies an open-minded and observant Englishman spent several months in a tour of the South, and his comments, based upon close and intelligent study, present one of the best descriptions extant of conditions of the time. He found at some points earnest efforts to bring again into cul-

ture their crops by the labor of their own families or neighbors, were making sure of meat and bread, milk and butter, fruit and vegetables as their chief means of livelihood. Rice growing had become an important and increasing industry in Louisiana. The sugar planters of that State were ready to introduce steam plows and other labor-saving machines in their operations, while cotton planters of Mississippi were seeking closer and more direct relations with cotton spinners and Tennessee farmers had begun to find broom corn a profitable crop. The discovery of marl deposits in the tidal region of Virginia, and of phosphate in South Carolina, had given an impetus to the question of reinforcing of the soil. Virginia had borne the brunt of the war, but the English traveler was greatly impressed by the buoyant spirit of the Virginians shown in the flocking of 20,000 persons to Richmond for the annual State fair, within six years of the surrender at Appomattox, and he found the mind of all classes occupied, with an intensity of interest to which no other public concern could be compared in such questions, as "how to attract settlers of a superior class from England and Scotland who would take their place in Virginian society as land owners and give a fresh impulse to the work of improvement going on; how to fertilize the soil and increase and improve the farm stock; how to turn the woods, the mines, the beds of marl, the streams and waterfalls, the fruits and game and all the abundance of nature to productive account, and so fill with new blood the wasted frame of the old Commonwealth."

Cotton-growing had only shortly before been relieved of the incubus of the internal revenue tax, but had not assumed the undue proportions which justified the genial Southern humorist, George W. Bagby, in giving currency a few years later in an address in South Carolina to the significant word, "cotton-tots." But the blood-sucking crop-lien system imposed upon the South by petty financial vampires at the time of the collapse of the older credit system there soon added compulsion to the natural inclination in a large portion of the South to resort to cotton-growing as a means of obtaining money for the rehabilitation of the plantation or farm and for actual food and clothing.

VALUE OF FARM LANDS AND IMPROVEMENTS.

States.	1880.	1890.	1900.	1910.
Alabama	\$78,954,648	\$111,051,390	\$134,618,183	\$287,673,000
Arkansas	74,249,655	118,574,422	135,182,170	308,129,000
District of Columbia	3,632,403	6,471,120	11,273,990	6,301,000
Florida	20,291,835	72,745,180	40,799,838	117,623,000
Georgia	111,910,540	152,006,230	183,370,120	477,603,000
Kentucky	299,298,631	346,339,360	382,004,890	633,782,000
Louisiana	58,989,117	85,381,270	141,130,610	238,682,000
Maryland	165,503,341	175,058,550	175,178,310	240,774,000
Mississippi	92,844,915	127,423,157	152,007,000	330,295,000
Missouri	375,633,307	625,858,361	843,979,213	1,710,505,000
North Carolina	135,793,602	183,977,010	194,655,920	455,715,000
Oklahoma		8,581,170	170,804,675	736,473,000
South Carolina	68,677,482	99,104,600	126,761,530	331,833,000
Tennessee	206,749,837	242,700,540	265,150,750	479,606,000
Texas	170,468,886	399,971,289	691,773,613	1,822,713,000
Virginia	216,028,107	254,490,600	271,578,200	530,918,000
West Virginia	133,147,175	151,880,300	168,295,670	262,458,000
Total	\$2,212,173,481	\$3,161,614,549	\$4,088,564,682	\$8,971,083,000
United States	\$10,197,096,776	\$13,279,252,649	\$16,614,647,491	\$34,681,507,000

AREA OF IMPROVED FARM LAND IN ACRES.

States.	1880.	1890.	1900.	1910.
Alabama	6,375,706	7,698,343	8,654,991	9,687,000
Arkansas	3,595,603	5,475,043	6,953,735	8,062,000
District of Columbia	12,632	9,898	5,934	5,000
Florida	947,640	1,145,693	1,511,653	1,803,000
Georgia	8,204,720	9,582,866	10,615,644	12,264,000
Kentucky	10,731,683	11,818,882	13,741,968	14,334,000
Louisiana	2,739,972	3,774,668	4,666,532	5,268,000
Maryland	3,342,700	3,412,908	3,516,352	3,353,000
Mississippi	5,216,937	6,849,390	7,594,428	8,959,000
Missouri	16,745,031	19,792,313	22,900,043	24,528,000
North Carolina	6,481,191	7,828,569	8,327,106	8,800,000
Oklahoma		563,728	8,574,187	17,496,000
South Carolina	4,132,050	5,255,237	5,775,741	6,085,000
Tennessee	8,496,556	9,362,555	10,245,950	10,875,000
Texas	12,650,314	20,746,215	19,576,076	27,120,000
Virginia	8,510,113	9,125,545	10,094,805	9,861,000
West Virginia	3,792,327	4,554,000	5,498,981	5,482,000
Total	101,975,175	126,995,853	148,254,126	173,982,000
United States	284,771,042	357,616,755	414,498,487	477,448,000

Thus it came about that cotton represented in 1880 probably 45 per cent. of the value of Southern farm products in that year, and the value of farm lands and improvements 15 years after the war was still \$328,000,000 less than in 1860. In only five States—Florida, Kentucky, Maryland, Missouri and Texas—were the values of 1880 greater than those of 1860. These farm values were \$21,000,000 less in Virginia and West Virginia together than they had been in the original Virginia, and they had been more than halved in Alabama, Mississippi and in South Carolina, and had been reduced in Louisiana from \$215,600,000 to \$58,989,000.

The magnificent spirit of the South shown immediately after the war in the determination to build up anew, with little but ruin as a foundation, had for nearly ten years been obliged

to combat a menace to civilization far worse in its effects than the loss of life and property in war, and to contend against wholesale robbery under the guise of government. It is no wonder that, materially, the South in some respects was more crippled in 1880 than in 1870. But its spirit had not been destroyed, however greatly it had been hampered and harassed.

That is proved by the figures of 1910, clearly indicating the recuperation of farming in the South. With its population only 1,037,022 greater than the population of the whole country in 1860, the 1910 value of Southern farm lands

tivation formerly productive estates, and at others, lands practically deserted, with neglected roads become impassable, and even the best examples of the restoration of fences and buildings incomplete. The elements that fastened the evil crop lien system upon the South were already on hand with their 40 per cent. interest per annum and their willingness to sell goods to impoverished planters at a profit of 100 or 200 per cent. There was a scarcity of live-stock and much dependence upon other sections for foodstuffs. The negro population, just released from the restraints and the discipline of the institution of slavery, had only begun to be affected by the deterioration that came to them within the next fifteen or twenty years. In spite of tentative plans here and there to induce immigration, an extensive movement of trains of bullock wagons carrying farmers and their families from the seaboard States to Texas and Arkansas was noted.

On the other hand, restlessness of the negroes had encouraged the white population of the hill districts to increase the size of their small crops of cotton, adding considerable to the general total, and had opened the way for them to become buyers or renters of cotton lands in the richer bottoms. This class, self-dependent as to food and clothing in their highland homes, were widening their operations into diversified agriculture, and, while saving

and improvements was \$2,326,037,993 greater than the value of such property in the United States in 1860, and within \$1,226,000,000 of such value in the United States in 1880.

Many and hard have been the lessons of the South in reaching its present plane of agricultural prosperity, and all the learning has not yet been gained. Quite effective, though extremely costly, was the lesson of the five years, 1895 to 1899, when cotton brought as low as six cents and six cents and a half a pound in New York, which meant much less for the grower. Such a starvation price set thousands of cotton-growers to giving more attention to raising their own hog and hominy. Its most beneficial influence, however, was doubtless in diverting the energies of many from cotton-growing into truck-raising and fruit culture, as well as the growing of staple grain crops. The advance of the boll-weevil from Mexico across a great portion of the cotton belt in the past ten years has been partly a blessing in disguise in that it has emphasized the intensely practical advantages of diversified agriculture.

The South has grown grain from its earliest days. In 1860 it raised 431,000,000 bushels of corn, or 52 per cent. of the total corn crop of the country; 49,093,000 bushels of wheat, or nearly 29 per cent. of the total of the country, and 32,178,000 bushels of oats, or something more than 18 per cent. of the total crop. It had in addition raised 376,500,000 pounds of tobacco, or 88 per cent. of the total; 38,900,000 bushels of sweet potatoes, or 94 per cent. of the total; 11,986,000 bushels of peas and beans, or 70 per cent. of the total, and all the rice and all the cane sugar of the country. In the year following the close of the war the South included in its production 378,801,000 bushels of corn, wheat and oats, or nearly 30 per cent. of the aggregate of those crops in the United States. So diversification is no new thing in Southern agriculture. The attention being given to it today is essentially merely a recrudescence of the policy which prevailed half a century ago when many of the larger plantations were practically self-supporting.

Planters of a couple of generations ago were in large numbers disinclined to give the needed attention to maintenance of soil fertility, such was the prodigality of nature, especially in the fresh lands of Alabama, Mississippi and the States beyond. But in the longer settled States there were many planters and farmers working out the problems of soil conservation and improvement, and their contributions to the farm publications of the day or to the debates in their local organizations dealt most practically and lucidly with matters which have been brought to the front in recent years almost as discoveries. The South of the past thirty years, however, has had the advantage of the intelligent work of agricultural colleges and experiment stations, co-operating more and more closely with the neighboring farmers and leading in campaigns of more than Statewide scope for the improvement of farm conditions generally.

Millions of pages of bulletins embodying the latest results of scientific investigation into soils, climatic conditions and the methods of handling crops of many kinds have been circulated by the wholesale, in farmers' institutes or in gatherings of like character, individual experiences have been discussed for the enlightenment of the mass and demonstrations on special lines, including the running of agricultural trains by great railroad systems have combined with the other influences in cultivating interest in the general subject of farming and in promoting marked advances in particular domains. This progress in scientific farming, which is, after all, nothing but the practical application of the results of well-directed and long-sustained observation covering a wide area, has been a splendid preparation for the campaign in diversification, accentuated by the necessities of cotton-growing.

All of these activities have given a spur to the process of differentiation in farming upon a much broader scale than that which was practiced upon many of the larger plantations fifty and sixty years ago. More attention is being given to the leading grains, especially corn. Only a few months ago a

SOUTHERN GRAIN PRODUCTION.

Years.	Corn.		Wheat.		Oats.	
	South.	United States.	South.	United States.	South.	United States.
1880..	627,288,000	1,717,435,000	84,866,000	498,550,000	80,515,000	417,885,000
1890..	625,000,000	1,489,970,000	60,883,000	399,262,000	86,098,000	523,621,000
1900..	671,509,000	2,105,103,000	130,863,000	522,230,000	108,693,000	800,126,000
1910..	1,285,615,000	3,125,713,000	138,123,000	635,443,000	119,209,000	1,126,765,000
1911..	1,071,862,000	2,776,301,000	121,870,000	655,516,000	80,105,000	873,641,000

farmer of Halifax County, Va., won a thousand-dollar premium cup in an exposition at New York for the best thirty ears of corn grown in this country, the corn being gathered from an acre that yielded 137 bushels. In 1910 Jerry Moore, a young South Carolinian, made the record for boys by raising 228 bushels and three pecks of corn on one acre of land. That year was a record breaker for the South with its crop of 1,285,615,000 bushels of corn. The increase in the crop over that of 1909 of 228,000,000 bushels was more than half the increase in the whole country, and every Southern State, except West Virginia and Oklahoma, had increases.

Wheat in the South was a rather notable crop in that year, too, its 138,000,000 bushels being an increase of nearly 44 per cent., while there was a decrease of more than 10 per cent. in the rest of the country. There has been some advance in oat production, slight, however, in comparison with that of corn and wheat, and far behind the rate of increase in rice.

In the past twenty years the center of rice production in this country has been transferred from the Atlantic seaboard States to Louisiana, Arkansas and Texas. The combination of drainage and irrigation in Louisiana's prairie section, which has since been extended to Texas, marked the beginning of this change, and more recently it has affected Arkansas. Ten years ago rice-growing in that State was not of enough importance to be treated statistically, but since 1905 the area planted in rice in its upland prairie section has increased from 460 acres to 77,000 acres, placing it third among the States in production. The revolution that has been accomplished in this particular is indicated in the fact that of the 705,000 acres planted in rice last year, Louisi-

ana, Arkansas and Texas had 686,300 acres, and the Carolinas, Georgia and Florida 15,700 acres.

Most of the tobacco of the country will always be raised in the South. It is grown in 46 States, but 75 per cent. of the annual crop, which is the basis of \$40,000,000 worth of exports a year and of a manufacturing industry in which \$250,000,000 is invested and which produces annually to the value of \$425,000,000, is grown in the South. Kentucky alone produces 38 per cent. of the total crop of the country, North Carolina ranking second and Virginia third in production. In some of the States, notably Florida, Alabama and Texas, success in raising the finest grades of the leaf points to an expansion on that line.

Less than ten years ago the delicious Spanish onions used in this country came principally from Bermuda. In 1900 some Texas farmers began to pay attention to that vegetable, and now more than 500 growers in the Gulf section of Texas are marketing between 2000 to 2500 carloads of onions every year of such a quality that the effects have been keenly felt in the island giving them their distinctive name, just as the development of the sulphur deposits of Louisiana have had a marked influence in far-away Sicily. Two counties on the Eastern Shore of Virginia produce annually between \$2,000,000 and \$3,000,000 worth of Irish potatoes and sweet potatoes, and the artesian wells of Sanford, Fla., have helped in making that a great celery-producing section.

Peanuts, having an annual production of about 15,000,000 bushels, have long been used principally for food. But the knowledge of the rich oils they contain has led to their utilization in the manufacture of a substitute for butter and a salad dressing, and has given practical direction to a campaign for the use of the peanuts in the cottonseed oil mills to meet the exigencies of the advance of the cotton boll-weevil across the South. About 350,000 acres, yielding on an average of 36 bushels to the acre, are now devoted to this crop in the South, but it is estimated that it is possible by proper cultivation to produce 60 bushels of peas and from one to two tons of forage from an acre, representing from \$48 to \$70 returns gross, or from \$36 to \$45 net. Experiments in using peanuts in cottonseed crushing plants have been tried with some success, and the conclusion has been reached that the grade of oil obtained is good and that the cake is left in shape for stock-feeding purposes. So great is the interest in this subject that at a conference early last year in Mississippi of railroad men, oil mill managers and farmers to discuss the falling off in cottonseed shipment, the manager of one cottonseed oil mill expressed a willingness to pay 75 cents a bushel for all peanuts that would be offered to him, his position being that peanuts would keep the oil mills running and fill in the gap made by the falling off in cottonseed.

The advantages for pecan growing have commanded wide attention, and though some unwise speculation may result a splendid industry is being created to the profit of the growers and the South. Considerable progress in this culture has been made in a broad stretch of country between the highlands and the coast from North Carolina to Texas, and it is reasonable to believe that much of that country will become really a great pecan district.

For a number of years the Albemarle pippin of Virginia was in some quarters regarded as the notable apple of the South, and it still holds its own in public favor, but with it are now grouped the apples of the Ozark region in Missouri and Arkansas and those of North Carolina, West Virginia along the apple pie ridge, Western Maryland and the Piedmont and Valley sections of Virginia. Improved cultural methods and treatment of the full-grown trees have demonstrated the ability of the South to raise as fine apples as any in the world, and the coming years will find the suitable slopes of country covered with apple orchards, making that section, with its peaches, which have a much wider area than apples for cultivation, the great fruit producer of the country. The severe freeze of twenty-odd years ago in Florida was thought at the time to have blasted the citrus fruit prospects of that State, but, on the contrary, while it turned the attention of many to truck-growing and thus brought the blessing of diversification, it developed a better system of protecting the groves from severe weather. And Florida is now making more money out of oranges than ever before, and grapefruit growing has become one of its most important industries. The growing of these and other sub-tropical fruits has been taken up in Alabama, Louisiana, Texas and other States.

In the center of the Georgia peach region there is said to be a locality peculiarly favorable to peach-growing because a constant stirring of the air by conflicting currents prevents the deposit of frost. Something of the same benignity of climate, added to soil conditions, is responsible for an extensive acreage in cabbages in Southwest Virginia, and for the enlargement of trucking operations in Tidewater Virginia about Norfolk and Eastern North Carolina, which produce annually about \$20,000,000 or \$30,000,000 worth of small fruits and vegetables. The Norfolk region was the original home in the South of this industry, but in the past fifteen or twenty years it has extended down the Atlantic and Gulf coasts, taking in the strawberries of East Carolina, the cabbages, potatoes, cucumbers, beans, asparagus, beets, lettuce, radishes, etc., of South Carolina, where the undertaking of one man alone near Charleston in raising cabbages for market and young plants for resetting means an annual business of \$1,500,000; Georgia, Florida, shipping strawberries as early as November; Mississippi sending sweet potatoes to Northern markets before December 15, the Chattanooga district of Tennessee, Louisiana, Texas and Arkansas. One county in Virginia has had a notable growth in its packing-house industry, which, for a while, was dominated by Maryland, and here and there in many of the Southern States the canning-house is becoming better recognized as a sure means of handling economically the surplus of truck-growing, which brings each year more than \$100,000,000 to the South from the great cities of other parts of the country.

Paralleling the increase in canneries is the building of meat-packing establishments, and the results obtained at Natchez, Miss.; at Fort Worth and Houston, Tex.; in Oklahoma and elsewhere in affording a market for beef

cattle and hogs, are speeding the movement in diversification of agriculture, which is making a healthy and lucrative diversion of the mind from intentness upon cotton-growing.

The good prices of cotton which prevailed between 1901 and 1910 were, to some degree, responsible for the marked increase in the aggregate value of twelve leading crops—corn, wheat, oats, barley, rye, buckwheat, flaxseed, rice, potatoes, hay, tobacco and cotton within that period. The figures by States for 1899, 1909 and 1910 are shown in the accompanying table:

VALUES OF TWELVE LEADING CROPS, 1899-1910.

	1899.	1909.	1910.	Increase per cent. 1899-1910.
Alabama.....	\$62,584,000	\$114,362,000	\$136,867,000	119
Arkansas.....	51,138,000	98,441,000	109,753,000	115
Florida.....	6,677,000	13,866,000	15,104,000	126
Georgia.....	72,985,000	166,177,000	210,192,000	188
Kentucky.....	65,655,000	122,260,000	110,731,000	69
Louisiana.....	43,180,000	71,495,000	63,448,000	47
Maryland.....	21,673,000	35,714,000	36,675,000	69
Mississippi.....	75,066,000	121,552,000	134,401,000	79
Missouri.....	104,429,000	201,109,000	189,955,000	82
North Carolina.....	53,214,000	103,153,000	122,037,000	129
Oklahoma.....	40,343,000	122,035,000	131,372,000	226
South Carolina.....	51,324,000	100,010,000	140,009,000	173
Tennessee.....	56,459,000	98,731,000	102,009,000	81
Texas.....	151,856,000	316,794,000	364,110,000	140
Virginia.....	41,517,000	60,888,000	71,264,000	72
West Virginia.....	18,450,000	43,046,000	39,333,000	113
Total.....	\$916,550,000	\$1,807,733,000	\$1,977,260,000	116
United States.....	\$2,511,155,000	\$4,652,656,000	\$4,547,554,000	81

The increase in the aggregate value of these twelve crops between 1899 and 1910 was from \$916,550,000 to \$1,977,260,000, or by \$1,060,710,000, equal to 116 per cent. in the South, and from \$1,594,605,000 to \$2,570,294,000, or by \$975,689,000, equal to 61.2 per cent. in the rest of the country. All but one of the Southern States had rates of increase greater than the average rate for the rest of the country, and seven of them rates greater than the average rate for the whole South. They were Oklahoma, 226 per cent.; Georgia, 188 per cent.; South Carolina, 173 per cent.; Texas, 140 per cent.; North Carolina, 129 per cent.; Florida, 126 per cent., and Alabama, 119 per cent.

The increase in the value of these farm products changed the proportion credited to the South from 36.5 per cent. of the whole country in 1899 to 41.3 per cent. in 1910, and resulted in the enhancement of the value of farm properties in spite of the comparatively slight expansion in the acreage under cultivation. There was likewise a marked increase in the values of implements and machinery and in the expenditures for fertilizers.

The value of implements and machinery on Southern farms in 1900 was \$206,464,000. Ten years later this value had increased by \$133,428,000, or by 64.6 per cent, to \$339,892,000, while the increase in the rest of the country was \$378,611,000, or 69.6 per cent., from \$543,314,000 to \$921,925,000.

In the rate of increase Oklahoma led the South with 157 per cent., Florida being second, 126 per cent.; Georgia third, 113 per cent.; South Carolina fourth, 112 per cent., and North Carolina fifth, 103 per cent., and Texas led in the actual increase with \$26,307,000.

In the whole country \$53,630,000 were spent for fertilizers in 1900, and of the total the South spent \$29,377,000, or 54.8 per cent. In the next ten years the South increased its expenditures by \$46,014,000, equal to 156.6 per cent., to \$75,391,000, which was 65.9 per cent. of the total expenditures of the country, while the increase in the rest of the country was from \$24,253,000 to \$38,882,000, or by \$14,629,000, equal to 60.3 per cent. Georgia increased its expenditures by \$11,080,000, or 193 per cent.; South Carolina by \$10,636,000, or 237 per cent.; North Carolina by \$7,766,000, or 173 per cent.; Alabama by \$5,028,000, or 193 per cent., and Virginia by \$3,243,000, or 88 per cent., while the 378 per cent. increase in Florida represented \$2,848,000.

The South increased its bill for farm labor from \$94,261,000 to \$177,783,000, or by \$83,522,000, equal to 86.6 per cent., while the increase in the rest of the country was from \$263,132,000 to \$474,079,000, or by \$210,947,000, equal to 80.6 per cent.

The progress in agriculture that has already been made in the South is, after all, but a beginning. Only 64 per cent. of its area is in farm lands, and of the farm lands less than a half are in cultivation. The total land area of the South is 604,856,320 acres, of which 384,117,000 acres are in farms, and but 173,982,000 acres of the farms are improved. Included in the farm lands are some thousand acres of the 258,700,000 acres of wood land or timber, and some of the 53,114,500 acres of wet or overflowed lands. Practically all of the wet acreage needs only drainage at a comparatively small cost, to let in the light and air, to become exceedingly productive soil, adding at least \$2,000,000,000 to the permanent wealth of the South and contributing \$1,000,000,000 to that section's annual agricultural production. Such reclamation is under way, notably in Florida, where the drainage of the Everglades will

bring into farming possibilities 8000 to 9000 square miles; in Virginia with its Dismal Swamp; in the Lake Mattamuskeet project in North Carolina, affecting between 100,000 and 120,000 acres; in the vicinity of Charleston, S. C., where results already secured are an incentive to greater endeavors; in the Mississippi delta country and in Louisiana, a pioneer in this field, where 30,000 acres have been reclaimed in recent years and several million dollars capital are represented in projects looking immediately to like work for more than 100,000 other acres; in Missouri and Arkansas, especially in the St. Francis basin region; in Texas and other States. Georgia has just passed a law, not unlike that of South Carolina, to facilitate the plan of drainage under local auspices. In Eastern Virginia there is a lively interest in the question, and steps will probably soon be taken in Maryland to drain the water from land that is naturally most productive.

In some drainage projects arrangements are made to use some of the machinery for irrigation in case of need, so that sufficient water may always be on hand. Oklahoma is awakening to the necessity for irrigation if its full agricultural potentialities are to be realized; the rice fields of Arkansas are irrigated from shallow wells and the same system is transforming the pan-handle of Texas, the old staked plains region, into productive farms, gardens and orchards around rapidly growing towns and cities. But irrigation on the greater scale in the South is being carried on, especially in the Rio Grande Valley of Texas, where probably \$20,000,000 have been invested in the past ten years in irrigation plants, lands and sugar mills and other industries created as a consequence of the settlement of land which five or six years ago could be bought for 25 cents to \$1 an acre, but which is now worth \$100 an acre. Irrigation enterprises to be completed this year will add more than 100,000 acres to cultivable area, capable of producing to the value of \$200 or \$300 an acre.

About 25,000,000 acres of the wooded land are on the heights of the Appalachians, never designed to become farms and fit only to be kept perpetually

covered with timber as a source of lumber and as a shelter for head-springs of important waterways. Other millions of acres of timber land should remain such, through careful and scientific handling of present growths, so that an adequate supply of lumber may be maintained. Beginnings in this direction have been made. But there are in the South 22,765,501 acres of cut-over lands upon which nothing is being done toward replacing the trees that have been destroyed. In Georgia, Mississippi, Louisiana and Texas, particularly, the capabilities of these lands as crop producers have been clearly demonstrated, and there is gradually developing a strong movement to bring them into the market. With additions from the wet lands, the cut-over lands and new territory to be opened by the timbermen, and with sufficient provision for the farm woodland and the lumber regions, it is possible to have in the South between 250,000,000 and 300,000,000 acres of arable lands improved in farms.

An important contribution to that end and an accompaniment to the full realization of farm potentialities will be the greater attention given to livestock. It is only necessary to glance at the exhibit of the comparative decline of live-stock raising in the past few years, compared with the growth of population, to understand how great an opportunity is being neglected by the South.

SOUTHERN LIVE-STOCK.

Years.	Cattle.		Sheep.		Swine.	
	South.	United States.	South.	United States.	South.	United States.
1880.....	14,189,000	34,032,000	10,365,000	42,192,000	21,132,000	47,682,000
1890.....	17,769,000	50,246,000	9,601,000	35,335,000	20,918,000	57,410,000
1900.....	25,224,000	67,719,000	8,652,000	61,504,000	23,086,000	62,868,000
1910.....	21,678,000	61,226,000	8,940,000	51,809,000	22,675,000	58,001,000

Meanwhile, it is interesting to note that between 1900 and 1910 the value of domestic stock in the South, including cattle, horses, mules, asses, sheep, goats, poultry, etc., increased from \$967,217,715 to \$1,589,240,320, or by \$622,022,605, equal to 64.3 per cent., while in the rest of the country the increase was at the rate of 56.9 per cent., from \$2,107,914,551 to \$3,305,708,462, or by \$1,197,793,911.

Another pressing question is that of improved highways. While there have been some notable achievements in road-building in the South in spots, a vast task is yet to be accomplished. But the enthusiasm and determination are there. Last year the sixteen States of the South spent close upon \$46,000,000 upon their roads, about 32 per cent. of the amount spent by the whole country for that purpose, and since 1904 the expenditures in the South have increased at the rate of nearly 100 per cent., as compared with an increase of less than 70 per cent. in the rest of the country. Still, the \$7,600,000 spent by Texas in 1911 was only about \$25 for each square mile of its territory, whereas the \$12,000,000 spent by New York were nearly \$252 for each square mile of its territory, and the expenditures in Pennsylvania and North Carolina were \$256 and \$92, respectively, for each square mile of the area of those States. Increasing readiness on the part of farmers to vote bonds for permanent road construction, or to provide funds in other ways, shows that they

accept the doctrine that road improvement and the betterment of farm conditions go hand in hand.

Many a farm in the Piedmont region has its stream coming with a good head from the hills and now of little value except for watering stock or, perhaps, for irrigation on a small scale. Advanced thinkers among the farmers, though, are studying the power possibilities in these streams and considering the chances for utilizing that power electrically in labor-saving devices about the home and in the barn and dairy. And this question of power, forced to the front by the inadequacy in some sections of human labor, is leading to a wider use of improved implements and machinery in the planting and harvesting of crops. A dozen or more aspirants are on hand with cotton-picking inventions, one of the last great additions to be made to agricultural operations, and it is not unlikely that a few years will see the inventions perfected to the point of being salable at a price within the means of the grower of a dozen bales, or operated on the basis of the wheat thresher, which in many parts of the country is hauled around from one farm to another to do the work for farmers who cannot afford to own a thresher, or of bringing about a modification in cotton-planting, so that the bulk of the crop will be raised upon large tracts of thousands of acres, where a machine, expensive as to first cost, may be operated most economically.

Cotton-picking today means a great waste of human labor that could be much more productive in other directions. The mechanical cotton-picker will be one of the ameliorations of that situation, but not the only one. The farm tractor, operated by electricity or by gasoline, is to make its influence felt,

either in breaking the soil, cultivating, harvesting or getting the products to market. With improved roads will come the motor truck of speed and economy, and with the substitution of the tractor for horse or mule will come the opportunity to feed more livestock for the market.

These economies of the mechanical kind must have their complements in the economies which come from co-operation of farmers, bankers and transportation agencies in the marketing of the crops, there being in existence half a dozen growers' organizations on a strictly business basis to that end, and in the economies of soil conservation and soil upbuilding, of making the most of every available resource on the farm, of assuring a return to the ground of the crop-food elements that are removed with every crop. Some land may be beyond restoration to its original fertility. But hardly any land may not be brought into some sort of usefulness. Much land is being carelessly treated and even neglected. There should be a revolution in that respect. There ought to be incentive to that in the figures of the increase in acre value of Southern farm lands in the ten years between 1900 and 1910. In the former year the value of all farm lands in the South averaged \$8 an acre. In the next ten years this value increased \$11, to over \$19 per acre, or more than 137 per cent. The acre value in 1910 was nearly \$3.50 more than the average acre value for the whole country in 1900, which was \$15.64, and which increased to \$32.48 in ten years. In view of past facts, certainly an advance in Southern farm lands in the next ten years may be expected to bring the average acre value up to the present average of \$32.48 for the United States. If every acre of Southern farm land should be brought into its full capability as a crop producer, the value would undoubtedly be much greater.

Varied Agricultural Products of the South



WITH the exception of a few thousand bushels of rice grown in California, the annual crop of 22,000,000 bushels is raised in nine Southern States. In 1880 nearly 77 per cent. of the crop was raised in the Carolinas, Georgia and Florida, but by 1890 the proportion in those States had fallen to a little more than 40 per cent., and is now but a smaller part of the total. That has come about, not through a decline in the quality of the rice of the Southeastern seaboard States, but because of a vast expansion in the acreage in rice-growing in Louisiana, Texas and Arkansas. That section had long produced small quantities of rice, but it was not until Western farmers applied the methods of wheat harvesting to the rice crop in the later eighties and not until a pumping plant and canal system began operations in 1894 that a revolution was wrought in this domain that has given Louisiana the premiership in the quantity of rice produced in the South, and Arkansas had a like position as to the average yield per acre among the Southern States. In 1911, of the 22,928,000 bushels harvested in the South, 11,693,000, or more than 50 per cent., were raised in Louisiana; 8,174,000 in Texas and 2,792,000 in Arkansas, the aggregate yield of these three States being 98 per cent. of the total crop. Arkansas, which scarcely figured in rice production ten years ago, had more than 71,000 acres planted, which yielded an average of 39 bushels to the acre, Mississippi ranking next, with an average of 36 bushels, and Texas having an average of 34.3 bushels, the average for the country being 32.9 bushels.

Louisiana has long been the special home of the sugar-cane, another crop peculiar to the Southern States, as far as it is raised in this country. In the season of 1880-81 it yielded 121,867 long tons of sugar, other Southern States yielding 5500 tons, and last season it yielded 300,000 tons, while Texas, where the cane sugar acreage has greatly widened since 1903, produced 11,000 tons. The estimate for the present season is 325,000 tons for Louisiana and 15,000 tons for Texas. These two States produce only about 30 per cent. of the cane sugar within the whole territory and possessions of the United States, and a far less proportion of the total world production, and continental United States, which consumes 22 per cent. of the world's production of cane and beet sugar, consumes more than thirteen times as much as is grown in this country.

Peanuts averaging from 16,000,000 to 18,000,000 bushels a year are another almost distinctively Southern crop. Of the 19,850,000 bushels raised in the South in 1909, 5,981,000 were raised in North Carolina, 4,284,000 in Virginia, 2,570,000 in Georgia, 2,315,000 in Florida, 1,574,000 in Alabama, 1,076,000 in Texas, about 1,000,000 in Tennessee, 412,000 in Louisiana, 285,000 in Mississippi, 169,000 in Arkansas, 159,000 in South Carolina, 32,000 in Oklahoma, 3200 in Missouri, 1700 in Kentucky, and a small number of bushels in Maryland and West Virginia.

A glance at the accompanying table will show the preponderance of the South in tobacco-growing. This staple crop is grown in 46 States, but 14 Southern States produced last year 644,100,000 pounds, or 70 per cent. of the country's crop of 905,109,000 pounds. Kentucky alone produced 303,000,000 pounds, or more than 30 per cent. of the total crop in the country and more than 47 per cent. of the Southern crop, Virginia ranking second among the States of the country with 128,000,000 pounds; North Carolina third, with 99,400,000 pounds; Tennessee fourth, with 62,370,000 pounds, and Maryland fifth, with 19,110,000 pounds. South Carolina and West Virginia each produced more than 11,000,000 pounds.

Because the climatic conditions permit of much out-of-door feeding in winter in large areas of the South, comparatively little hay has been raised there, but the 1911 crop of 5,404,000 tons, of which nearly a third was raised in Missouri, was something more than 11 per cent. of the total crop of 47,444,000 tons of the country. Included in the hay and forage crops of the South are timothy, clover, alfalfa, millet, other tame or cultivated grasses, roots, grains cut green, wild grasses, some roots and cottonseed products.

About one-eleventh of the Irish potato crop of the country is raised in the South, Virginia yielding 4,275,000 bushels, and Texas being second, with

2,850,000; Missouri third, with 2,565,000 bushels; Kentucky fourth, with 2,028,000 bushels, and West Virginia fifth, with 1,980,000 bushels.

The South's Irish potato crop of 26,368,000 bushels is, however, only about half as great as its crop of sweet potatoes and yams, in the production of which in 1909, the latest year for which figures are available, North Carolina led, with 8,493,000 bushels, Georgia being second, with 7,426,000 bushels; Alabama third, with 5,315,000 bushels; Virginia fourth, with 5,270,000 bushels, and Mississippi fifth, with 4,428,000 bushels. The total crop in that year in the South was 51,544,000 bushels.

In the ten years between 1899 and 1909 Oklahoma made a record in the increase in broom corn culture. It more than doubled its potato acreage and increased eight times its acreage in kafir corn and milo maize, but its broom corn area was expanded from 12,763 acres to 202,458 acres, or nearly sixteen-fold, and yielded 42,732,000 pounds, or an average of 199 pounds to the acre. The Oklahoma crop was nearly 90 per cent. of the total Southern crop, the next Southern State to it in production being Texas, with 2,368,000 pounds.

The crops here mentioned, some of them special in the South, some of them common to the country, together with rye, barley, buckwheat, flaxseed, hemp, hops, soy beans, velvet beans and others, suggest the great opportunities in the South for farmers accustomed to conditions in other parts of the country which cannot raise rice, sugar, oranges, lemons, grapefruit, figs or peanuts.

In addition to the wider range for their activities offered farmers in the South, they have the advantage of a climate that in some sections permits of work every month in the year, of soils which, under proper treatment, will

SOME SOUTHERN CROPS OF 1911.

	Irish Potatoes, Bushels.	Hay, Tons.	Tobacco, Pounds.	Rice, Bushels.
Alabama	1,170,000	168,000	140,000	6,000
Arkansas	1,430,000	230,000	480,000	2,792,000
Florida	900,000	23,000	2,444,000	18,000
Georgia	864,000	117,000	1,080,000	39,000
Kentucky	2,028,000	428,000	303,000,000	.....
Louisiana	1,518,000	31,000	225,000	11,693,000
Maryland	1,755,000	199,000	19,110,000	.....
Mississippi	747,000	150,000	.....	76,000
Missouri	2,565,000	1,458,000	4,800,000	.....
North Carolina.....	1,488,000	169,000	99,400,000	13,000
Oklahoma	540,000	648,000	.....	.....
South Carolina.....	700,000	69,000	11,016,000	117,000
Tennessee	1,558,000	400,000	62,370,000	.....
Texas	2,850,000	606,000	195,000	8,174,000
Virginia	4,275,000	280,000	128,000,000	.....
West Virginia.....	1,980,000	428,000	11,250,000	.....
Total	26,368,000	5,404,000	644,110,000	22,928,000
United States.....	292,737,000	47,444,000	905,109,000	22,934,000

bear two or three crops in the twelve months; of a low fuel bill for the house and of other economies compared with the expenses of life in bleaker regions. Lands in the South are still much cheaper than lands in other parts of the country. But its cost is bound to advance, especially as diversification, whether in the form of raising home supplies in addition to a money crop, or in giving attention to other money crops than cotton, tobacco, rice or sugar, becomes more and more the policy in Southern agriculture. Cotton will average more per acre than corn or wheat or oats, but rice will yield more than cotton, and Irish potatoes or sweet potatoes or onions more than rice. Alfalfa is becoming a favorite and more profitable crop than cotton, and the apple orchard a better standby. Markets for products are constantly increasing in number and widening in demand, both in the South with the rise of industrial centers and in the rest of the country with the trend of population to the great centers, and, taking into consideration the comparatively lighter cost of living in the South for the farmer and the relatively greater productivity of the land there, the returns from the markets as a whole will net him more than those he would receive from the staple crops in the North and West.

Grain-Growing Potentialities of the South

GRAIN-GROWING in the South has developed pretty generally as grain-growing in the rest of the country. Its accomplishments thus far, however, have been suggestive rather of its capabilities than of its limitations. In proportion to its area it is doing its full share of corn-raising, but it can raise much more corn. Vast stretches of its territory may not be suitable for wheat, but its wheat-growing area is by no means yielding what it may. The same is true as to oats.

Including corn, oats, wheat, barley, buckwheat, rye, spelt, rice, flaxseed, kafir corn and milo maize, the South is producing annually nearly 1,750,000,000 bushels of grain. Since the days when, to relieve famine conditions in Massachusetts, corn was shipped from the plantations of the Chesapeake, that grain has been the leading one in the South, and it has constituted about 83 per cent. of the total production of corn, wheat and oats since 1880. In that time the South has raised 24,485,309,000 bushels of corn, or an average of 765,166,000 bushels a year, while the rest of the country has raised 41,333,987,000 bushels, or an annual average of 1,291,687,000 bushels. The total production in the South has been nearly 38 per cent. of the country's production, but the proportion in the South has gradually increased. Its 627,288,000 bushels in 1880 were 36.5 per cent. of the total 1,717,435,000 bushels, whereas its 1,285,615,000 bushels in 1910, the record year for the South, as well as for the country, were 41.1 per cent. of the total 3,125,713,000 bushels. Between 1880 and 1910 the production in the South more than doubled, while that in the rest of the country increased from 1,090,147,000 bushels to 1,840,098,000 bushels, or by 749,952,000 bushels, equal to 68.8 per cent. Disregarding Oklahoma, which did not figure in 1880, the production in the South had an increase of 565,975,000 bushels, or 90 per cent.

Texas led in the actual increase in the number of bushels in the thirty-one years, with Missouri second, Louisiana third, Georgia fourth and Mississippi fifth. The increases by States were: Alabama, 40,753,000 bushels, or 179.7 per cent.; Arkansas, 36,866,000, or 113.9 per cent.; Florida, 5,292,000, or 150.3 per cent.; Georgia, 43,775,000, or 199 per cent.; Kentucky, 19,230,000,

or 22.3 per cent.; Louisiana, 43,922,000, or 294.5 per cent.; Maryland, 2,083,000, or 9.6 per cent.; Mississippi, 43,038,000, or 181 per cent.; Missouri, 113,437,000, or 70.7 per cent.; North Carolina, 20,185,000, or 54.6 per cent.; South Carolina, 32,987,000, or 280.8 per cent.; Tennessee, 33,878,000, or 54.2 per cent.; Virginia, 9,391,000, or 20.8 per cent., and West Virginia, 6,613,000, or 38.2 per cent. Between 1900 and 1910 Oklahoma increased its production at the rate of 553 per cent. from 14,144,000 bushels to 92,352,000 bushels, but in 1911 the production was but 46,371,000 bushels.

There have been wider variations in production of wheat than of corn. But the tendency has been for the South to increase its share in the country's annual crop from 84,866,000 bushels, or 17 per cent. of the total 498,550,000

bushels in 1880, to 138,123,000 bushels, 19.9 per cent. of the total 695,443,000 bushels in 1910, when its largest crop was harvested. The largest crop in the country was 748,460,000 in 1901, and the South's share of that was 17.2 per cent.

Between 1880 and 1911 the South raised 2,948,359,000 bushels of wheat, or an average of 92,136,000 bushels a year, while the rest of the country raised 4,525,425,000 bushels, or an annual average of 141,419,000 bushels.

The largest increase in any one State between 1880 and 1910 was 15,772,000 bushels in Texas, followed by increases of 5,329,000 bushels in Maryland, 4,113,000 bushels in South Carolina, 3,108,000 bushels in Tennessee, 2,562,000 bushels in North Carolina, 1,439,000 bushels in Virginia and 1,354,000 bushels in Arkansas. Excluding Oklahoma, not counted in 1880, the increase for the South in the thirty-two years was 27,894,000 bushels, or 32.9 per cent. That increase was less than the aggregate increase in the seven States specifically mentioned, and the difference is accounted for by the decreases in Georgia, Kentucky, Mississippi and Missouri. All of the States, except Kentucky, Mississippi and West Virginia, had in 1911 greater production than in 1880.

The South's oat crop was 410,000 bushels less in 1911 than in 1880, but the 1910 production was 38,694,000 bushels greater than that of 1880, and even then did not equal the record production of 121,299,000 bushels in

LEADING GRAIN CROPS IN THIRTY-TWO YEARS

CORN—BUSHELS.

Years.	The South.	United States.
1880.....	627,288,000	1,717,435,000
1881.....	398,077,000	1,194,916,000
1882.....	655,162,000	1,617,025,000
1883.....	587,525,000	1,551,067,000
1884.....	631,120,000	1,795,528,000
1885.....	696,583,000	1,936,176,000
1886.....	625,527,000	1,665,441,000
1887.....	633,364,000	1,456,161,000
1888.....	712,188,000	1,987,790,000
1889.....	738,558,000	2,112,892,000
1890.....	625,600,000	1,489,970,000
1891.....	739,152,000	2,060,154,000
1892.....	597,179,000	1,628,464,000
1893.....	593,943,000	1,619,496,000
1894.....	599,434,000	1,212,770,000
1895.....	846,736,000	2,151,139,000
1896.....	630,199,000	2,283,875,000
1897.....	641,810,000	1,902,968,000
1898.....	730,119,000	1,924,185,000
1899.....	673,374,000	2,078,144,000
1900.....	671,509,000	2,105,103,000
1901.....	501,430,000	1,522,520,000
1902.....	845,816,000	2,523,648,000
1903.....	919,759,000	2,244,177,000
1904.....	916,507,000	2,467,481,000
1905.....	957,207,000	2,707,994,000
1906.....	1,092,356,000	2,927,416,000
1907.....	1,070,070,000	2,592,320,000
1908.....	1,112,683,000	2,668,651,000
1909.....	1,057,557,000	2,772,376,000
1910.....	1,285,615,000	3,125,713,000
1911.....	1,071,862,000	2,776,301,000
Total.....	24,485,309,000	65,819,296,000

WHEAT—BUSHELS.

Years.	The South.	United States.
1880.....	84,866,000	498,550,000
1881.....	68,755,000	383,280,000
1882.....	95,309,000	504,185,000
1883.....	76,373,000	421,086,000
1884.....	87,827,000	512,765,000
1885.....	44,671,000	357,112,000
1886.....	72,986,000	457,218,000
1887.....	80,128,000	456,329,000
1888.....	72,703,000	415,868,000
1889.....	75,699,000	490,560,000
1890.....	60,883,000	399,262,000
1891.....	89,415,000	611,780,000
1892.....	78,539,000	515,949,000
1893.....	68,218,000	396,132,000
1894.....	76,375,000	460,267,000
1895.....	65,855,000	467,103,000
1896.....	63,964,000	427,684,000
1897.....	89,129,000	530,149,000
1898.....	106,206,000	675,149,000
1899.....	82,954,000	547,304,000
1900.....	130,863,000	522,230,000
1901.....	128,822,000	748,460,000
1902.....	119,694,000	670,063,000
1903.....	116,043,000	637,822,000
1904.....	108,583,000	552,400,000
1905.....	105,413,000	692,979,000
1906.....	131,376,000	735,261,000
1907.....	97,328,000	634,087,000
1908.....	104,612,000	664,602,000
1909.....	104,777,000	737,189,000
1910.....	138,123,000	695,443,000
1911.....	121,870,000	655,516,000
Total.....	2,948,359,000	7,473,784,000

OATS—BUSHELS.

Years.	The South.	United States.
1880.....	80,515,000	417,885,000
1881.....	73,715,000	416,481,000
1882.....	92,047,000	488,251,000
1883.....	91,649,000	571,302,000
1884.....	94,396,000	583,628,000
1885.....	106,987,000	629,409,000
1886.....	102,637,000	624,134,000
1887.....	121,299,000	659,618,000
1888.....	113,092,000	701,735,000
1889.....	114,098,000	751,515,000
1890.....	86,098,000	523,621,000
1891.....	100,362,000	738,394,000
1892.....	94,076,000	661,035,000
1893.....	114,906,000	638,855,000
1894.....	104,117,000	662,037,000
1895.....	117,884,000	824,444,000
1896.....	90,461,000	707,346,000
1897.....	87,504,000	698,768,000
1898.....	98,576,000	730,907,000
1899.....	84,186,000	796,178,000
1900.....	108,693,000	809,126,000
1901.....	67,770,000	736,809,000
1902.....	103,279,000	987,843,000
1903.....	96,725,000	784,094,000
1904.....	94,609,000	894,596,000
1905.....	99,192,000	953,216,000
1906.....	98,875,000	964,905,000
1907.....	63,577,000	754,443,000
1908.....	82,938,000	807,156,000
1909.....	86,681,000	1,007,353,000
1910.....	119,209,000	1,126,765,000
1911.....	80,105,000	873,641,000
Total.....	3,070,258,000	23,525,490,000

1887. Not counting Oklahoma, the increase in the South between 1880 and 1910 was 15,626,000 bushels, or 19.4 per cent., and the greatest increase in any one State was 17,389,000 bushels, or 250.6 per cent., in Texas, there having been in 1910 marked decreases from 1880 in Kentucky, Maryland, North Carolina, Tennessee and Virginia. The opportunities for open feeding in the South account in great measure for the fact that while that section is raising about 40 per cent. of the corn of the country and 20 per cent. of the wheat, its share of the oat production is only about 13 per cent.

Figures of acreage production are, perhaps, the best index to tendencies in grain-growing in the South. In all the grains the production per acre in Oklahoma, because of seasonable conditions, was less in 1911 than in earlier years, and that fact, together with the absence of figures for 1880, and the additional fact that the 1911 figures are preliminary, should be borne in mind in considering the general subject. In 1910 the average number of bushels of corn, wheat and oats produced per acre in the South was greater than in 1880, and the average in wheat and in oats was greater than the average in those two grains in the whole country in 1880. Between 1880 and 1910 the production per acre of corn increased nine-tenths of a bushel in the South, while decreasing two-tenths of a bushel in the country as a whole. The increases in individual States were 5.6 bushels in Alabama, 3.6 in Florida, 5.3

spect not unlike that of wheat. In 1910 the South as a whole raised 11.7 more bushels of oats to the acre than in 1880, the increases in the several States being 9.3 bushels, or more than 100 per cent. in Alabama, 9.5 in Arkansas, 6.7 in Florida, 8.2 in Georgia, 7 in Kentucky, 6.5 in Louisiana, 6 in Maryland, 4.2 in Mississippi, 12.1 in Missouri, 7.2 in North Carolina, 7 in South Carolina, 10 in Tennessee, 9 in Texas, 11, or 100 per cent. in Virginia, and 5.2 bushels in West Virginia. The production of oats in Oklahoma in 1910 was 36.5 bushels to the acre, or 4.6 bushels more than the average for the whole country, and 8.6 greater than the average for the whole South. These averages, in spite of variations year by year, show what the South can accomplish in grain production.

It will be noted that in grain-growing there have been comparatively slight changes since 1880 in such of the older States as Kentucky, Maryland and Virginia, and that the tendency in corn especially to decreased acreage production as in such States as Arkansas, Oklahoma and Texas reflect the change that has usually occurred with the decline of the primal fertility of virgin soil before more careful methods of culture have been adopted.

But with the corn crop of 1910 constituting nearly 42 per cent. of the corn crop of the country, and with the average acreage production in the South showing an increase between 1900 and 1910 of 4.6 bushels, with the average

SOUTHERN GRAIN PRODUCTION BY DECADES.

CORN.						OATS.					
States.	Production, thousands of bushels.					States.	Production, thousands of bushels.				
	1880.	1890.	1900.	1910.	†1911.		1880.	1890.	1900.	1910.	†1911.
Alabama	22,679	25,390	29,356	63,432	65,970	Alabama	2,926	4,864	4,381	5,494	5,702
Arkansas	32,350	33,443	45,226	69,216	59,987	Arkansas	2,749	3,967	7,039	4,730	3,440
Florida	3,522	4,570	4,156	8,814	9,899	Florida	436	573	378	502	432
Georgia	21,939	31,306	34,119	65,714	73,232	Georgia	6,185	5,455	7,010	6,243	7,374
Kentucky	86,040	63,645	69,267	105,270	97,759	Kentucky	7,026	3,954	9,309	4,250	2,981
Louisiana	14,913	16,979	24,702	58,835	47,590	Louisiana	405	567	614	774	777
Maryland	21,702	16,333	15,233	23,785	25,915	Maryland	2,278	1,357	1,783	810	702
Mississippi	23,218	24,396	25,232	66,256	63,251	Mississippi	3,021	4,778	2,390	3,360	3,275
Missouri	160,463	175,345	180,710	273,900	213,642	Missouri	25,314	24,579	24,695	26,208	12,168
North Carolina ..	36,954	36,264	29,790	57,139	55,910	North Carolina ..	5,515	6,198	5,046	3,458	3,102
Oklahoma	*	*	14,144	92,352	46,371	Oklahoma	*	*	*	23,068	7,580
South Carolina ..	11,746	16,078	13,129	44,733	45,522	South Carolina ..	3,688	4,168	4,023	4,599	4,549
Tennessee	62,470	67,692	56,998	96,348	95,390	Tennessee	5,849	6,486	5,810	4,600	3,627
Texas	66,755	63,802	81,963	181,280	96,096	Texas	6,936	11,059	28,278	24,325	18,499
Virginia	45,230	36,922	28,184	54,621	51,408	Virginia	5,775	6,587	5,168	4,268	3,800
West Virginia ..	17,307	13,435	19,300	23,920	23,920	West Virginia ..	2,412	1,506	2,769	2,520	2,097
Total	627,288	625,600	671,509	1,285,615	1,071,862	Total	80,515	86,098	108,693	119,209	80,105
United States ..	1,717,435	1,489,970	2,105,103	3,125,713	2,776,301	United States ..	417,885	523,621	809,126	1,126,765	873,641
*No figures accessible. †Preliminary figures.						*No figures accessible. †Preliminary figures.					

in Georgia, 4.6 in Louisiana, 1.5 in Maryland, 5.9 in Mississippi, 4.6 in Missouri, 2.2 in North Carolina, 9.2 in South Carolina, nearly doubling the acreage production in that State; 3.5 in Tennessee and a half a bushel in Virginia. There were decreases in Arkansas, Kentucky, Texas and West Virginia.

In wheat the production per acre increased 4.2 bushels in the South as a whole, and no State showed a decrease, the average per acre more than doubling in Alabama, Mississippi and South Carolina, and increasing by 6.9 bushels in Arkansas, 4.2 in Georgia, 4.1 in Kentucky, 3.4 in Maryland, four-tenths in Missouri, 5 bushels in North Carolina, 5.7 in Tennessee, 7 in Texas, 3.3 in Virginia and three-tenths of a bushel in West Virginia.

Oats have had a history in this re-

WHEAT.					
States.	Production, thousands of bushels.				
	1880.	1890.	1900.	1910.	†1911.
Alabama	1,402	1,319	916	1,560	1,630
Arkansas	1,356	1,575	2,689	2,710	2,236
Georgia	3,056	1,411	5,011	2,730	3,096
Kentucky	10,565	9,152	12,443	9,600	9,804
Maryland	8,487	6,208	15,188	13,816	12,322
Mississippi	281	286	41	70	108
Missouri	29,563	17,638	18,847	25,130	34,462
North Carolina ..	4,871	3,156	5,961	7,433	7,187
Oklahoma	*	*	18,657	25,363	8,984
South Carolina ..	870	750	2,143	4,983	5,632
Tennessee	7,539	7,873	11,696	10,647	10,546
Texas	3,008	3,575	23,396	18,780	11,665
Virginia	8,737	5,614	9,422	10,176	9,552
West Virginia ..	5,131	2,326	4,453	5,125	4,646
Total	84,866	60,883	130,863	138,123	121,870
United States ..	498,550	399,262	522,230	695,443	655,516
*No figures accessible. †Preliminary figures.					

for the country increasing only 2.1 bushels, results of greater attention to improved methods in grain-culture are already apparent. There is hardly a single Southern State in which prizes for grain crops are not offered each year by agricultural organizations, industrial bodies, bankers or others, and the emulation among growers thus encouraged, together with the wide publicity given to the results, is having a marked effect not only in the case of corn, but as to other grains that must bring great advantage to the South in the not distant future. The more attention given to grain-growing, the better balanced will Southern farm operations become, and the stronger will be the position of the agricultural South generally toward the question of the annual price of cotton.

AVERAGE YIELD OF GRAIN PER ACRE—BUSHELS.

States.	Corn.					Wheat.					Oats.				
	1880.	1890.	1900.	1910.	1911.	1880.	1890.	1900.	1910.	1911.	1880.	1890.	1900.	1910.	1911.
Alabama	12.4	10.2	11.0	18.0	18.0	5.4	4.5	9.5	12.0	11.4	9.2	12.0	14.4	18.5	19.2
Arkansas	25.0	16.7	19.0	24.0	20.8	7.0	7.1	10.1	13.9	10.5	18.0	13.5	22.2	27.5	20.0
Florida	9.4	9.3	8.0	13.0	14.6	...	...	...	...	...	9.5	10.7	11.3	16.2	13.5
Georgia	9.2	10.5	10.0	14.5	16.0	6.3	4.1	9.1	10.5	12.0	10.0	9.7	15.0	18.2	21.5
Kentucky	29.1	22.6	26.0	29.0	26.4	8.7	9.7	13.0	12.8	12.9	18.0	8.5	21.3	25.0	18.4
Louisiana	19.0	16.0	17.0	23.6	18.0	...	...	...	...	...	15.0	13.2	18.0	21.5	21.0
Maryland	32.0	22.5	26.0	33.5	36.5	14.0	11.6	19.5	17.4	15.5	24.0	12.0	24.0	30.0	27.0
Mississippi	14.6	12.5	11.0	20.5	19.0	6.8	4.7	9.6	14.0	12.0	15.0	13.2	14.0	19.2	18.4
Missouri	28.4	25.8	28.0	33.0	26.0	13.4	11.0	12.5	13.8	15.7	21.5	17.4	27.4	33.6	15.6
North Carolina ..	16.4	13.3	12.0	18.6	18.2	6.4	4.4	9.6	11.4	10.6	11.0	9.2	13.9	18.2	16.5
Oklahoma .....	...	...	26.0	16.0	7.8	...	...	19.0	16.3	8.0	...	...	...	36.5	10.0
South Carolina ..	9.3	10.2	7.0	18.5	18.1	4.8	4.2	9.0	11.0	11.4	14.0	10.6	15.5	21.0	20.4
Tennessee	22.4	18.8	20.0	25.9	25.9	6.0	6.7	9.9	11.7	11.5	13.0	9.5	16.6	23.0	19.5
Texas	25.0	15.5	18.0	20.6	10.4	8.0	7.0	18.4	15.0	9.4	26.0	17.3	38.0	35.0	25.1
Virginia	25.0	17.5	16.0	25.5	24.0	9.5	7.0	11.9	12.8	12.0	11.0	9.8	14.8	22.0	20.0
West Virginia ..	30.0	20.0	27.0	26.0	26.0	12.2	7.7	9.8	12.5	11.5	20.0	10.6	21.0	25.2	21.4
Total	21.7	17.3	18.0	22.6	18.5	9.5	7.9	13.5	13.7	12.1	16.2	12.5	22.0	27.9	18.2
United States ..	27.6	20.7	25.3	27.4	23.9	13.1	11.1	12.3	14.1	12.6	25.8	19.8	29.6	31.9	24.8

Southward Trend of the Textile Industry



MORE than 57,975,000 tons of cotton have been raised in the South since 1880. Of the total amount nearly 66 per cent., or 37,993,000 tons, has been shipped to foreign countries. Of the aggregate of 288,588,439 bales in thirty-two crops between 1880 and 1911, mills of the United States have used 99,449,611 bales, and of that amount Southern mills have used 37,532,673 bales, or 37.7 per cent.

Nearly 68 per cent. of the 1880 crop, or 3,885,003 bales, went abroad, but the 7,770,842 bales exported in 1911 represented 64.1 per cent. of the commercial crop of this country in that year. There has been comparatively slight change in the proportion of the crop exported, but the position of Southern mills in comparison with those of the rest of the country has been reversed. Of the crop of 1880 Southern mills took 179,000 bales, or 3.1 per cent., and the mills in the rest of the country took 1,610,978 bales, or 27.9 per cent. Last year the 2,363,616 bales taken by Southern mills were 19.5 per cent. of the commercial crop, and the 1,993,576 bales taken by mills in the rest of the country were 16.4 per cent.

Four times since 1880 the takings by mills in the rest of the country of American grown cotton have been less than the 1880 takings, the smallest amount having been 1,455,125 bales in 1885, and the largest number of bales taken in that quarter was 2,683,118 in 1909. Over the whole period, though, the annual takings in the rest of the country increased only by 382,598 bales, or 23.8 per cent., while the Southern record, 2,559,873 bales in 1909, which was the year of the largest American cotton crop before the one of 15,000,000 bales or more now being marketed, have increased by 2,184,616 bales, or at the rate of 1,220.1 per cent. In 1880 Southern consumption was a little more than 10 per cent. of the total in the United States, but by 1911 it had increased to 54.2 per cent. The most rapid advance in any decade of the three was between 1880 and 1893, when the Southern mill takings increased from 179,000 bales to 546,894 bales, or by 367,894 bales, equal to 205.5 per cent., while in the rest of the country the increase was at the rate of only 11.8 per cent., from 1,610,978 bales to 1,799,258 bales, or by 188,280 bales. The increase in the number of bales taken by Southern mills in the next ten years, amounting to 1,650,218 bales, or nearly three times the increase of the preceding decade, was at the rate of 192 per cent., while the increased rate of 14.9 per cent. for the mills in the rest of the country represented 269,042 bales.

It was not until 1897 that Southern mills passed the 1,000,000-bale mark in consumption, but by 1909 they passed the 1,500,000-bale mark and by 1913 the 2,000,000-bale mark. In that year for the first time they took more bales than the mills in the rest of the country. That achievement has been repeated four times, in 1906, 1908, 1910 and 1911, and it forecasts the normal condition that is to prevail in this country. For, the interest of outside capital in the Southern textile industry, already strongly manifested, is found to increase.

Way back in the early fifties there was apprehension in New England that Southern cotton mills, which had successfully entered the western field with their goods, were menacing the prosperity of the New England plants, and within five or ten years after the resumption of Southern industrial life the cry of Southern competition was again raised in the words of ex-Governor Cutler of Rhode Island, "The Southern mills are selling their products today in the market fifteen or twenty per cent. cheaper than we of Rhode Island can afford to."

Up to that time Southern energy and Southern capital, the latter of small beginnings, but assuming larger proportions as the earnings of the mills were invested in enlargements or in the building of additional mills, had been responsible for the upbuilding

of the industry. Gradually outside capital began to find its way into that channel, and a striking tribute to its growing importance was paid when the New England Cotton Manufacturers' Association held in 1895 its annual meeting in Atlanta, for the first time gathering at a place beyond its own borders. Since then much outside money has been invested in Southern mill-stocks, and large New England concerns have either built independent mills or large branch ones of most approved pattern and with the best surroundings, notably in Georgia and Alabama.

The figures which have been cited deal only with the cotton mills in the cotton-growing States of the South and with the commercial crop for the year ending August 31. But in the table on the following page, showing the progress in the textile industry, are included the figures for mills in all the Southern States having them, the amount of cotton used being stated in pounds. These show an increase in the number of active spindles between 1880 and 1911 in the South from 687,066 to 11,336,898, or by 10,649,832, equal to 1550 per cent., and in the number of active looms from 14,754 to 239,186, or by 224,432, equal to 1521.2 per cent., the advance in the rest of the country being in the number of spindles from 9,966,369 to 17,535,102, or by 7,568,733, equal to 75.9 per cent., and in the number of looms from 211,005 to 445,814, or 111.2 per cent. In the same period the number of pounds of cotton used by Southern mills increased from 111,777,177 to 1,143,033,633, or by 1,031,256,456, equal to 922.7 per cent., and the increase in the rest of the country was from

638,566,804 to 956,684,367, or by 318,117,563, equal to 49.9 per cent. The increase in the number of pounds of cotton used in the thirty-two years was more than three times as great in the Southern mills than in the mills in the rest of the country. In 1911 the South had 683,463 more spindles and 13,427 more looms, and consumed 392,689,652 more pounds of cotton than all the mills in the United States in 1880.

This development, which is one of the most striking in the history of American industry, has taken place, though, within a comparatively small area of the South, and in such a way as to permit the imagination, even with a tight rein, to picture in the not distant future an almost continuous highway along the ridge country from Virginia into Georgia, extending through a cotton mill community. Nearness to water-powers used directly of old, but now, through hydro-electric development, being capable of utilization at points hundreds of miles from the streams, stamped that region as a peculiar home of the cotton mill. Therefore, it is hardly remarkable that in 1911 three States, North Carolina, South Carolina and Georgia, which raised 3,878,000 bales, or 31.9 per cent. of the total crop of 12,120,000 bales, had 9,238,057 spindles, or 81 per cent. of the total number, 11,336,898, in the South, while Texas, which raised 3,259,000 bales, or 26.9 per cent. of the total crop, had only 85,682 spindles, and Arkansas, Louisiana, Oklahoma and Texas, which together raised 5,302,000 bales, or 43.8 per cent. of the total crop, had only 144,038 spindles and used only 27,946,264 bales, which was only 2.5 per cent. of the quantity used in the whole South.

Another mighty influence in the creation of such a situation was the presence of several hundred thousand whites in scattered, and, for the most part, isolated coves and nooks of the highlands. There meager farming was carried on, yielding a bare livelihood to the workers and making little or no improvement from one generation to another. At bottom of fine character, these mountain whites led a narrow life, with few opportunities to rub up against their fellows and fewer for enjoying religious and educational advantages. From the very beginning of the cotton mill industry, more than a century ago, the operatives have been recruited largely from this class, thus given the means of having a

DISPOSITION OF THIRTY-TWO COTTON CROPS.

Year Ended. August 31.	Crop. Bales.	U. S. Consumption.		Exports, Bales.	Average Price Per Lb. N.Y., Middling Uplands, Cents.
		South, Bales.	North, Bales.		
1880.....	5,761,252	179,000	1,610,978	3,885,003	12.02
1881.....	6,605,750	208,000	1,730,937	4,589,346	11.34
1882.....	5,456,048	236,000	1,728,535	3,582,622	12.16
1883.....	6,949,756	340,000	1,733,096	4,766,597	10.63
1884.....	5,713,200	337,000	1,539,683	3,916,581	10.64
1885.....	5,706,165	298,000	1,455,125	3,947,972	10.54
1886.....	6,575,691	345,000	1,817,544	4,336,203	9.44
1887.....	6,505,087	401,452	1,710,080	4,463,009	10.25
1888.....	7,046,833	456,090	1,804,993	4,685,031	10.27
1889.....	6,938,290	479,781	1,785,979	4,830,463	10.71
1890.....	7,311,322	546,894	1,799,258	5,000,879	11.53
1891.....	8,652,597	604,661	2,027,362	5,856,194	9.03
1892.....	9,035,379	686,080	2,190,766	5,917,249	7.64
1893.....	6,700,365	743,848	1,687,286	4,500,047	8.24
1894.....	7,549,817	718,515	1,601,173	5,336,553	7.67
1895.....	9,901,251	862,838	2,083,839	6,889,577	6.50
1896.....	7,157,346	904,701	1,600,271	4,751,602	8.16
1897.....	8,757,964	1,042,671	1,804,680	6,092,537	7.72
1898.....	11,199,994	1,231,841	2,211,740	7,690,477	6.22
1899.....	11,274,840	1,399,399	2,190,095	7,454,161	6.00
1900.....	9,436,416	1,597,112	2,068,300	6,055,874	8.69
1901.....	10,383,422	1,620,931	1,967,570	6,649,152	8.96
1902.....	10,680,680	1,937,971	2,050,774	6,740,538	8.75
1903.....	10,727,559	2,000,729	1,967,635	6,771,398	10.27
1904.....	10,011,374	1,919,252	2,026,967	6,114,498	12.42
1905.....	13,565,885	2,163,505	2,282,145	8,773,037	9.11
1906.....	11,345,988	2,374,225	2,349,478	6,763,551	11.29
1907.....	13,510,982	2,439,108	2,526,390	8,503,270	11.45
1908.....	11,571,966	2,193,277	1,896,661	7,573,349	11.29
1909.....	13,825,457	2,559,873	2,680,118	8,574,024	10.12
1910.....	10,609,668	2,341,303	1,993,904	6,339,428	14.97
1911.....	12,120,095	2,363,616	1,993,576	7,770,842	14.55

Total..... 288,588,439 37,532,673 61,916,938 189,121,064

NOTE.—The figures of Southern consumption in the first seven years are estimates in part. The figures of exports in the last seven years include linters.

THE COMMERCIAL COTTON CROP.

States.	1910-11.	1909-10.	1908-09.	1907-08.	1906-07.
Ala.	1,209,000	1,078,000	1,428,000	1,171,000	1,289,000
Ark.	846,000	718,000	1,052,000	787,000	940,000
Fla.	68,000	66,000	75,000	60,000	65,000
Ga.	1,853,000	1,927,000	2,118,000	1,964,000	1,695,000
La.	273,000	282,000	485,000	673,000	995,000
Okla.	924,000	566,000	704,000	950,000	944,000
Miss.	1,239,000	1,121,000	1,673,000	1,496,000	1,541,000
S. C.* ..	794,000	676,000	747,000	689,000	663,000
N. C.	1,231,000	1,184,000	1,298,000	1,226,000	957,000
Tenn.† ..	424,000	316,000	426,000	335,000	372,000
Tex.	3,259,000	2,676,000	3,819,000	2,221,000	4,050,000
Total ...	12,120,000	10,610,000	13,825,000	11,572,000	13,511,000

*Including Kentucky and Virginia. †Including Missouri, Arizona, California, Kansas and New Mexico. Cotton has been raised as far north as Maryland and Illinois, but its domain for commercial production lies south of latitude 37 degrees north. Last year it was grown in 16 States and two Territories. The commercial crop by States during the past five years ending August 31 is shown in this table.

1887. Not counting Oklahoma, the increase in the South between 1880 and 1910 was 15,626,000 bushels, or 19.4 per cent., and the greatest increase in any one State was 17,389,000 bushels, or 250.6 per cent., in Texas, there having been in 1910 marked decreases from 1880 in Kentucky, Maryland, North Carolina, Tennessee and Virginia. The opportunities for open feeding in the South account in great measure for the fact that while that section is raising about 40 per cent. of the corn of the country and 20 per cent. of the wheat, its share of the oat production is only about 13 per cent.

Figures of acreage production are, perhaps, the best index to tendencies in grain-growing in the South. In all the grains the production per acre in Oklahoma, because of seasonable conditions, was less in 1911 than in earlier years, and that fact, together with the absence of figures for 1880, and the additional fact that the 1911 figures are preliminary, should be borne in mind in considering the general subject. In 1910 the average number of bushels of corn, wheat and oats produced per acre in the South was greater than in 1880, and the average in wheat and in oats was greater than the average in those two grains in the whole country in 1880. Between 1880 and 1910 the production per acre of corn increased nine-tenths of a bushel in the South, while decreasing two-tenths of a bushel in the country as a whole. The increases in individual States were 5.6 bushels in Alabama, 3.6 in Florida, 5.3

spect not unlike that of wheat. In 1910 the South as a whole raised 11.7 more bushels of oats to the acre than in 1880, the increases in the several States being 9.3 bushels, or more than 100 per cent. in Alabama, 9.5 in Arkansas, 6.7 in Florida, 8.2 in Georgia, 7 in Kentucky, 6.5 in Louisiana, 6 in Maryland, 4.2 in Mississippi, 12.1 in Missouri, 7.2 in North Carolina, 7 in South Carolina, 10 in Tennessee, 9 in Texas, 11, or 100 per cent. in Virginia, and 5.2 bushels in West Virginia. The production of oats in Oklahoma in 1910 was 36.5 bushels to the acre, or 4.6 bushels more than the average for the whole country, and 8.6 greater than the average for the whole South. These averages, in spite of variations year by year, show what the South can accomplish in grain production.

It will be noted that in grain-growing there have been comparatively slight changes since 1880 in such of the older States as Kentucky, Maryland and Virginia, and that the tendency in corn especially to decreased acreage production as in such States as Arkansas, Oklahoma and Texas reflect the change that has usually occurred with the decline of the primal fertility of virgin soil before more careful methods of culture have been adopted.

But with the corn crop of 1910 constituting nearly 42 per cent. of the corn crop of the country, and with the average acreage production in the South showing an increase between 1900 and 1910 of 4.6 bushels, with the average

SOUTHERN GRAIN PRODUCTION BY DECADES.

CORN.						OATS.					
States.	Production, thousands of bushels.					States.	Production, thousands of bushels.				
	1880.	1890.	1900.	1910.	†1911.		1880.	1890.	1900.	1910.	†1911.
Alabama	22,679	25,390	29,356	63,432	65,970	Alabama	2,926	4,864	4,381	5,494	5,702
Arkansas	32,350	33,443	45,226	69,216	59,987	Arkansas	2,749	3,967	7,039	4,730	3,440
Florida	3,522	4,570	4,156	8,814	9,899	Florida	436	573	378	502	432
Georgia	21,939	31,306	34,119	65,714	73,232	Georgia	6,185	5,455	7,010	6,243	7,374
Kentucky	86,040	63,645	69,267	105,270	97,759	Kentucky	7,026	3,954	9,309	4,250	2,981
Louisiana	14,913	16,979	24,702	58,835	47,590	Louisiana	405	567	614	774	777
Maryland	21,702	16,333	15,233	23,785	25,915	Maryland	2,278	1,357	1,783	810	702
Mississippi	23,218	24,396	25,232	66,256	63,251	Mississippi	3,021	4,778	2,390	3,360	3,275
Missouri	160,463	175,345	180,710	273,900	213,642	Missouri	25,314	24,579	24,695	26,208	12,168
North Carolina ..	36,954	36,264	29,790	57,139	55,910	North Carolina ..	5,515	6,198	5,046	3,458	3,102
Oklahoma	*	*	14,144	92,352	46,371	Oklahoma	*	*	*	23,068	7,580
South Carolina ..	11,746	16,078	13,129	44,733	45,522	South Carolina ..	3,688	4,168	4,023	4,599	4,549
Tennessee	62,470	67,692	56,998	96,348	95,390	Tennessee	5,849	6,486	5,810	4,600	3,627
Texas	66,755	63,802	81,963	181,280	96,096	Texas	6,936	11,059	28,278	24,325	18,499
Virginia	45,230	36,922	28,184	54,621	51,408	Virginia	5,775	6,587	5,168	4,268	3,800
West Virginia ..	17,307	13,435	19,300	23,920	23,920	West Virginia ..	2,412	1,506	2,769	2,520	2,097
Total	627,288	625,600	671,509	1,285,615	1,071,862	Total	80,515	86,098	108,693	119,209	80,105
United States	1,717,435	1,489,970	2,105,103	3,125,713	2,776,301	United States	417,885	523,621	809,126	1,126,765	873,641

*No figures accessible.

†Preliminary figures.

*No figures accessible.

†Preliminary figures.

In Georgia, 4.6 in Louisiana, 1.5 in Maryland, 5.9 in Mississippi, 4.6 in Missouri, 2.2 in North Carolina, 9.2 in South Carolina, nearly doubling the acreage production in that State; 3.5 in Tennessee and a half a bushel in Virginia. There were decreases in Arkansas, Kentucky, Texas and West Virginia.

In wheat the production per acre increased 4.2 bushels in the South as a whole, and no State showed a decrease, the average per acre more than doubling in Alabama, Mississippi and South Carolina, and increasing by 6.9 bushels in Arkansas, 4.2 in Georgia, 4.1 in Kentucky, 3.4 in Maryland, four-tenths in Missouri, 5 bushels in North Carolina, 5.7 in Tennessee, 7 in Texas, 3.3 in Virginia and three-tenths of a bushel in West Virginia.

Oats have had a history in this re-

WHEAT.

States.	Production, thousands of bushels.				
	1880.	1890.	1900.	1910.	†1911.
Alabama	1,402	1,319	916	1,560	1,630
Arkansas	1,356	1,575	2,689	2,710	2,236
Georgia	3,056	1,411	5,011	2,730	3,096
Kentucky	10,565	9,152	12,443	9,600	9,804
Maryland	8,487	6,208	15,188	13,816	12,322
Mississippi	281	286	41	70	108
Missouri	29,563	17,638	18,847	25,130	34,462
North Carolina ..	4,871	3,156	5,961	7,433	7,187
Oklahoma	*	*	18,657	25,363	8,984
South Carolina ..	870	750	2,143	4,983	5,632
Tennessee	7,539	7,873	11,696	10,647	10,546
Texas	3,008	3,575	23,396	18,780	11,665
Virginia	8,737	5,614	9,422	10,176	9,552
West Virginia ..	5,131	2,326	4,453	5,125	4,646
Total	84,866	60,883	130,863	138,123	121,870
United States	498,550	399,262	522,230	695,443	655,516

*No figures accessible.

†Preliminary figures.

for the country increasing only 2.1 bushels, results of greater attention to improved methods in grain-culture are already apparent. There is hardly a single Southern State in which prizes for grain crops are not offered each year by agricultural organizations, industrial bodies, bankers or others, and the emulation among growers thus encouraged, together with the wide publicity given to the results, is having a marked effect not only in the case of corn, but as to other grains that must bring great advantage to the South in the not distant future. The more attention given to grain-growing, the better balanced will Southern farm operations become, and the stronger will be the position of the agricultural South generally toward the question of the annual price of cotton.

AVERAGE YIELD OF GRAIN PER ACRE—BUSHELS.

States.	Corn.					Wheat.					Oats.				
	1880.	1890.	1900.	1910.	1911.	1880.	1890.	1900.	1910.	1911.	1880.	1890.	1900.	1910.	1911.
Alabama	12.4	10.2	11.0	18.0	18.0	5.4	4.5	9.5	12.0	11.4	9.2	12.0	14.4	18.5	19.2
Arkansas	25.0	16.7	19.0	24.0	20.8	7.0	7.1	10.1	13.9	10.5	18.0	13.5	22.2	27.5	20.0
Florida	9.4	9.3	8.0	13.0	14.6	...	...	...	...	...	9.5	10.7	11.3	16.2	13.5
Georgia	9.2	10.5	10.0	14.5	16.0	6.3	4.1	9.1	10.5	12.0	10.0	9.7	15.0	18.2	21.5
Kentucky	29.1	22.6	26.0	29.0	26.4	8.7	9.7	13.0	12.8	12.9	18.0	8.5	21.3	25.0	18.4
Louisiana	19.0	16.0	17.0	23.6	18.0	...	...	...	...	...	15.0	13.2	18.0	21.5	21.0
Maryland	32.0	22.5	26.0	33.5	36.5	14.0	11.6	19.5	17.4	15.5	24.0	12.0	24.0	30.0	27.0
Mississippi	14.6	12.5	11.0	20.5	19.0	6.8	4.7	9.6	14.0	12.0	15.0	13.2	14.0	19.2	18.4
Missouri	28.4	25.8	28.0	33.0	26.0	13.4	11.0	12.5	13.8	15.7	21.5	17.4	27.4	33.6	15.6
North Carolina ..	16.4	13.3	12.0	18.6	18.2	6.4	4.4	9.6	11.4	10.6	11.0	9.2	13.9	18.2	16.5
Oklahoma .....	...	...	26.0	16.0	7.8	...	...	19.0	16.3	8.0	...	...	...	36.5	10.0
South Carolina ..	9.3	10.2	7.0	18.5	18.1	4.8	4.2	9.0	11.0	11.4	14.0	10.6	15.5	21.0	20.4
Tennessee	22.4	18.8	20.0	25.9	25.9	6.0	6.7	9.9	11.7	11.5	13.0	9.5	16.6	23.0	19.5
Texas	25.0	15.5	18.0	20.6	10.4	8.0	7.0	18.4	15.0	9.4	26.0	17.3	38.0	35.0	25.1
Virginia	25.0	17.5	16.0	25.5	24.0	9.5	7.0	11.9	12.8	12.0	11.0	9.8	14.8	22.0	20.0
West Virginia ..	30.0	20.0	27.0	26.0	26.0	12.2	7.7	9.8	12.5	11.5	20.0	10.6	21.0	25.2	21.4
Total	21.7	17.3	18.0	22.6	18.5	9.5	7.9	13.5	13.7	12.1	16.2	12.5	22.0	27.9	18.2
United States	27.6	20.7	25.3	27.4	23.9	13.1	11.1	12.3	14.1	12.6	25.8	19.8	29.6	31.9	24.8

Southward Trend of the Textile Industry



MORE than 57,975,000 tons of cotton have been raised in the South since 1880. Of the total amount nearly 66 per cent., or 37,993,000 tons, has been shipped to foreign countries. Of the aggregate of 288,588,439 bales in thirty-two crops between 1880 and 1911, mills of the United States have used 99,449,611 bales, and of that amount Southern mills have used 37,532,673 bales, or 37.7 per cent.

Nearly 68 per cent. of the 1880 crop, or 3,885,003 bales, went abroad, but the 7,770,842 bales exported in 1911 represented 64.1 per cent. of the commercial crop of this country in that year. There has been comparatively slight change in the proportion of the crop exported, but the position of Southern mills in comparison with those of the rest of the country has been reversed. Of the crop of 1880 Southern mills took 179,000 bales, or 3.1 per cent., and the mills in the rest of the country took 1,610,978 bales, or 27.9 per cent. Last year the 2,363,616 bales taken by Southern mills were 19.5 per cent. of the commercial crop, and the 1,993,576 bales taken by mills in the rest of the country were 16.4 per cent.

Four times since 1880 the takings by mills in the rest of the country of American grown cotton have been less than the 1880 takings, the smallest amount having been 1,455,125 bales in 1885, and the largest number of bales taken in that quarter was 2,680,118 in 1909. Over the whole period, though, the annual takings in the rest of the country increased only by 382,598 bales, or 23.8 per cent., while the Southern takings, which also had their highest record, 2,559,873 bales in 1909, which was the year of the largest American cotton crop before the one of 15,000,000 bales or more now being marketed, have increased by 2,184,616 bales, or at the rate of 1,220.1 per cent. In 1880 Southern consumption was a little more than 10 per cent. of the total in the United States, but by 1911 it had increased to 54.2 per cent. The most rapid advance in any decade of the three was between 1880 and 1891, when the Southern mill takings increased from 179,000 bales to 546,894 bales, or by 367,894 bales, equal to 205.5 per cent., while in the rest of the country the increase was at the rate of only 11.8 per cent., from 1,610,978 bales to 1,799,258 bales, or by 188,280 bales. The increase in the number of bales taken by Southern mills in the next ten years, amounting to 1,050,218 bales, or nearly three times the increase of the preceding decade, was at the rate of 192 per cent., while the increased rate of 14.9 per cent. for the mills in the rest of the country represented 269,042 bales.

It was not until 1897 that Southern mills passed the 1,000,000-bale mark in consumption, but by 1909 they passed the 1,500,000-bale mark and by 1903 the 2,000,000-bale mark. In that year for the first time they took more bales than the mills in the rest of the country. That achievement has been repeated four times, in 1906, 1908, 1910 and 1911, and it forecasts the normal condition that is to prevail in this country. For, the interest of outside capital in the Southern textile industry, already strongly manifested, is bound to increase.

Way back in the early fifties there was apprehension in New England that Southern cotton mills, which had successfully entered the western field with their goods, were menacing the prosperity of the New England plants, and within five or ten years after the resumption of Southern industrial life the cry of Southern competition was again raised in the words of ex-Governor Cutler of Rhode Island, "The Southern mills are selling their products today in the market fifteen or twenty per cent. cheaper than we of Rhode Island can afford to."

Up to that time Southern energy and Southern capital, the latter of small beginnings, but assuming larger proportions as the earnings of the mills were invested in enlargements or in the building of additional mills, had been responsible for the upbuilding

of the industry. Gradually outside capital began to find its way into that channel, and a striking tribute to its growing importance was paid when the New England Cotton Manufacturers' Association held in 1895 its annual meeting in Atlanta, for the first time gathering at a place beyond its own borders. Since then much outside money has been invested in Southern mill-stocks, and large New England concerns have either built independent mills or large branch ones of most approved pattern and with the best surroundings, notably in Georgia and Alabama.

The figures which have been cited deal only with the cotton mills in the cotton-growing States of the South and with the commercial crop for the year ending August 31. But in the table on the following page, showing the progress in the textile industry, are included the figures for mills in all the Southern States having them, the amount of cotton used being stated in pounds. These show an increase in the number of active spindles between 1880 and 1911 in the South from 687,066 to 11,336,898, or by 10,649,832, equal to 1550 per cent., and in the number of active looms from 14,754 to 239,186, or by 224,432, equal to 1521.2 per cent., the advance in the rest of the country being in the number of spindles from 9,966,369 to 17,535,102, or by 7,568,733, equal to 75.9 per cent., and in the number of looms from 211,005 to 445,814, or 111.2 per cent. In the same period the number of pounds of cotton used by Southern mills increased from 111,777,177 to 1,143,033,633, or by 1,031,256,456, equal to 922.7 per cent., and the increase in the rest of the country was from

638,566,804 to 956,684,367, or by 318,117,563, equal to 49.9 per cent. The increase in the number of pounds of cotton used in the thirty-two years was more than three times as great in the Southern mills than in the mills in the rest of the country. In 1911 the South had 683,463 more spindles and 13,427 more looms, and consumed 392,689,652 more pounds of cotton than all the mills in the United States in 1880.

This development, which is one of the most striking in the history of American industry, has taken place, though, within a comparatively small area of the South, and in such a way as to permit the imagination, even with a tight rein, to picture in the not distant future an almost continuous highway along the ridge country from Virginia into Georgia, extending through a cotton mill community. Nearness to water-powers used directly of old, but now, through hydro-electric development, being capable of utilization at points hundreds of miles from the streams, stamped that region as a peculiar home of the cotton mill. Therefore, it is hardly remarkable that in 1911 three States, North Carolina, South Carolina and Georgia, which raised 3,878,000 bales, or 31.9 per cent. of the total crop of 12,120,000 bales, had 9,238,057 spindles, or 81 per cent. of the total number, 11,336,898, in the South, while Texas, which raised 3,259,000 bales, or 26.9 per cent. of the total crop, had only 85,682 spindles, and Arkansas, Louisiana, Oklahoma and Texas, which together raised 5,302,000 bales, or 43.8 per cent. of the total crop, had only 144,038 spindles and used only 27,946,264 bales, which was only 2.5 per cent. of the quantity used in the whole South.

Another mighty influence in the creation of such a situation was the presence of several hundred thousand whites in scattered, and, for the most part, isolated coves and nooks of the highlands. There meager farming was carried on, yielding a bare livelihood to the workers and making little or no improvement from one generation to another. At bottom of fine character, these mountain whites led a narrow life, with few opportunities to rub up against their fellows and fewer for enjoying religious and educational advantages. From the very beginning of the cotton mill industry, more than a century ago, the operatives have been recruited largely from this class, thus given the means of having a

DISPOSITION OF THIRTY-TWO COTTON CROPS.

Year Ended, August 31.	Crop, Bales.	—U. S. Consumption—		Average Price Per Lb. N.Y.	
		South, Bales.	North, Bales.	Exports, Uplands, Bales.	Middling Cents.
1880.....	5,761,252	179,000	1,610,978	3,885,003	12.02
1881.....	6,605,750	208,000	1,730,937	4,589,346	11.34
1882.....	5,456,048	236,000	1,728,535	3,582,622	12.16
1883.....	6,949,756	340,000	1,733,096	4,766,597	10.63
1884.....	5,713,200	337,000	1,539,683	3,916,581	10.64
1885.....	5,706,165	298,000	1,455,125	3,947,972	10.54
1886.....	6,575,691	345,000	1,817,544	4,336,203	9.44
1887.....	6,505,087	401,452	1,710,080	4,463,009	10.25
1888.....	7,046,833	456,090	1,804,993	4,685,031	10.27
1889.....	6,938,290	479,781	1,785,979	4,830,463	10.71
1890.....	7,311,322	546,894	1,799,258	5,000,879	11.53
1891.....	8,652,597	604,661	2,027,362	5,856,194	9.03
1892.....	9,035,379	686,080	2,190,766	5,917,249	7.64
1893.....	6,700,365	743,848	1,687,286	4,500,047	8.24
1894.....	7,549,817	718,515	1,601,173	5,336,553	7.67
1895.....	9,901,251	862,838	2,083,839	6,889,577	6.50
1896.....	7,157,346	904,701	1,600,271	4,751,602	8.16
1897.....	8,757,964	1,042,671	1,804,680	6,092,537	7.72
1898.....	11,199,994	1,231,841	2,211,740	7,690,477	6.22
1899.....	11,274,840	1,399,399	2,190,095	7,454,161	6.00
1900.....	9,436,416	1,597,112	2,068,300	6,055,874	8.69
1901.....	10,383,422	1,620,931	1,967,570	6,649,152	8.96
1902.....	10,680,680	1,937,971	2,050,774	6,740,538	8.75
1903.....	10,727,559	2,000,729	1,967,635	6,771,398	10.27
1904.....	10,011,374	1,919,252	2,026,967	6,114,498	12.42
1905.....	13,565,885	2,163,505	2,282,145	8,773,037	9.11
1906.....	11,345,988	2,374,225	2,349,478	6,763,551	11.29
1907.....	13,510,982	2,439,108	2,526,390	8,503,270	11.45
1908.....	11,571,966	2,193,277	1,896,661	7,573,349	11.29
1909.....	13,825,457	2,559,873	2,680,118	8,574,024	10.12
1910.....	10,609,668	2,341,303	1,993,904	6,339,428	14.97
1911.....	12,120,095	2,363,616	1,993,576	7,770,842	14.55
Total.....	288,588,439	37,532,673	61,916,938	189,121,064	

NOTE.—The figures of Southern consumption in the first seven years are estimates in part. The figures of exports in the last seven years include linters.

THE COMMERCIAL COTTON CROP.

States.	1910-11.	1909-10.	1908-09.	1907-08.	1906-07.
Ala.	1,209,000	1,078,000	1,428,000	1,171,000	1,289,000
Ark.	846,000	718,000	1,052,000	787,000	940,000
Fla.	68,000	66,000	75,000	60,000	65,000
Ga.	1,853,000	1,927,000	2,118,000	1,964,000	1,695,000
La.	273,000	282,000	485,000	673,000	995,000
Okla.	924,000	566,000	704,000	950,000	944,000
Miss.	1,239,000	1,121,000	1,673,000	1,496,000	1,541,000
N. C.	794,000	676,000	747,000	689,000	663,000
S. C.	1,231,000	1,184,000	1,298,000	1,226,000	957,000
Tenn.† ...	424,000	316,000	426,000	335,000	372,000
Tex.	3,259,000	2,676,000	3,819,000	2,221,000	4,050,000
Total ...	12,120,000	10,610,000	13,825,000	11,572,000	13,511,000

*Including Kentucky and Virginia. †Including Missouri, Arizona, California, Kansas and New Mexico. Cotton has been raised as far north as Maryland and Illinois, but its domain for commercial production lies south of latitude 37 degrees north. Last year it was grown in 16 States and two Territories. The commercial crop by States during the past five years ending August 31 is shown in this table.

regular wage, instead of being compelled to scratch out from the earth an uncertain living, and of cultivating social instincts long suppressed in a condition in which the half-starvation of the body had been equalled by that of the mind. Hampered, as they have been, by lack of experience on the part of managements as well as by propagandas for the benefit of the operatives, some of them inspired by the loftiest but misdirected motives, but some of them the expression of unfriendliness and most of them grounded in utter ignorance of the real fundamentals in the problem, the mills, nevertheless, have for forty or fifty years been doing a practical work for Southern unbuilding, the importance of which can hardly be estimated. By proper methods of conservation the supply of water for the generation of electric power for the machinery of the mills may be maintained for an indefinite time. But every family moved from the mountain cove to the lowland fields to grow cotton or to the mills to spin and weave it is just so much of a permanent reduction in the operative power to be derived from that source.

Within the past ten years there have been premonitions now and then of the possible shortage in the supply of this labor in spite of the widening of the textile curriculum for industrial training, as the mills have passed from spinning to weaving and from the making of coarser goods to lines of manufacture which older mill centers were formerly loath to believe would ever be within the province of the South. Mills in other parts of the country are now using fewer bales of American cotton yearly than Southern mills, but they are using them more profitably because the goods produced are of a finer quality and because, in some instances, they find it more economical to use yarns made in the South. But the Southern mills are following closely along the trail made wide and easy by the experience of mills elsewhere. They are still making yarns in large quantities, to be sure, but more and more attention is being given to the finer numbers, and, besides, they are turning out a great variety of other goods, such as sheetings, drills, shirtings, ducks, osnaburges, flannels, crashes, toweling, denims, cassimeres, organdies, percales, cottonades, chevots, prints, damasks, blankets, gingham, hosiery, checks, plaids, sateens, chambrays, tickings, lawns and dimities.

This diversification, however, has not been of long enough standing to overcome as yet some of the drawbacks connected with the sudden growth of the industry. As long as a single pound of cotton is shipped from the South to be converted into yarn, just so long will the South be short of its full textile equipment. But too much speed may be made in some directions, and there may be too little judgment in other particulars in advancing toward the cotton manufacturing status for which nature has qualified the South. Since 1907 there has been a growing conviction that the cotton mill development of the South has been rather one-sided, emphasis being given by the plight in which the mill men there, as in the rest of the country, have found themselves through failure of the price of finished goods to keep pace with the advance in the cost of raw cotton in the past ten years as the growers have again come to receive a just re-

PROGRESS IN TEXTILE INDUSTRY.

States.	1880.		
	Cotton Used, Lbs.	Spindles	Looms.
Alabama.....	7,271,791	49,432	863
Arkansas.....	340,000	2,015	28
Florida.....	166,250	816	.....
Georgia.....	33,757,199	198,656	4,493
Kentucky.....	1,882,234	9,022	73
Louisiana.....	644,000	6,096	120
Maryland.....	24,166,232	125,706	2,425
Mississippi.....	2,881,853	18,568	644
Missouri.....	3,082,188	19,312	431
North Carolina.....	11,832,641	92,385	1,790
South Carolina.....	15,601,005	82,334	1,676
Tennessee.....	4,944,279	35,736	818
Texas.....	119,986	2,648	71
Virginia.....	5,087,519	44,340	1,322
Total.....	111,777,177	687,066	14,754
United States.....	750,343,981	10,653,435	225,759
1890.			
Alabama.....	14,726,454	79,234	1,692
Arkansas.....	936,360	5,780	70
Georgia.....	69,139,410	445,452	10,459
Kentucky.....	5,751,305	42,942	677
Louisiana.....	6,006,000	46,200	1,200
Maryland.....	27,265,667	158,930	2,965
Mississippi.....	8,449,834	57,004	1,352
Missouri.....	1,080,540	6,670	110
North Carolina.....	53,546,289	337,786	7,254
South Carolina.....	64,000,600	332,784	8,546
Tennessee.....	15,779,360	97,524	2,043
Texas.....	2,430,000	15,000	560
Virginia.....	10,616,206	94,294	2,517
Total.....	279,728,025	1,719,600	39,445
United States.....	1,117,945,776	14,188,103	324,866
1900.			
Alabama.....	67,987,299	411,328	8,549
Arkansas.....	2,034,273	9,700	257
Georgia.....	145,833,115	815,545	19,398
Kentucky.....	11,971,815	66,633	991
Louisiana.....	7,282,350	55,600	1,584
Maryland.....	39,901,955	154,064	2,810
Mississippi.....	10,363,458	75,122	2,464
Missouri.....	2,171,000	13,654	300
North Carolina.....	190,138,759	1,134,909	25,469
South Carolina.....	230,053,807	1,431,349	42,663
Tennessee.....	15,040,336	123,896	2,995
Texas.....	9,304,434	48,756	1,018
Virginia.....	17,832,465	126,827	4,608
Total.....	749,915,066	4,467,383	113,106
United States.....	1,817,643,390	19,050,952	455,752
1910.			
Alabama.....	113,142,210	952,643	17,066
Arkansas.....	2,914,814	7,264	240
Georgia.....	236,665,997	1,871,389	38,836
Kentucky.....	10,846,314	84,078	1,312
Louisiana.....	5,170,715	88,136	1,832
*Maryland.....	30,048,000	143,000	3,000
Mississippi.....	13,826,944	145,468	4,208
Missouri.....	6,299,393	38,576	994
North Carolina.....	317,466,720	3,163,199	55,600
Oklahoma.....	1,029,200	5,800	250
South Carolina.....	302,627,415	3,950,800	96,027
Tennessee.....	33,096,093	250,566	4,265
Texas.....	14,128,085	90,010	2,445
Virginia.....	34,698,567	358,536	10,770
Total.....	1,121,960,467	11,149,465	236,845
*United States.....	1,838,127,768	28,611,000	682,000
1911.			
Alabama.....	112,360,777	938,368	17,050
Arkansas.....	2,761,056	6,808	164
Georgia.....	239,900,148	1,901,110	38,786
Kentucky.....	10,301,385	84,643	1,312
Louisiana.....	4,541,125	45,836	614
*Maryland.....	29,645,000	145,000	2,300
Mississippi.....	14,207,595	127,108	3,016
Missouri.....	6,758,520	30,304	722
North Carolina.....	335,697,863	3,227,832	57,041
Oklahoma.....	1,760,930	5,712	.....
South Carolina.....	294,455,232	4,109,115	100,749
Tennessee.....	33,263,998	245,552	4,083
Texas.....	18,883,153	85,682	2,194
Virginia.....	38,496,851	383,828	11,155
Total.....	1,143,033,633	11,336,898	239,186
*United States.....	2,099,718,000	28,872,000	685,000

*Partly estimated. These figures are for active spindles and looms consuming American cotton.

ward for their labor. With raw cotton cheap and with trade in goods flourishing, the mill managements felt no necessity to look far ahead, and others were tempted to enter, without full financial or other resources, a field in which notable successes had been recorded. Consequently, there has been an overproduction, but only a temporary one, of goods of similar grade. That does not imply by any means that the Southern textile industry has neared its limit. It ought to lead, though, to a more business-like handling of chances still unrivalled. The big combination of ten or twelve years ago of mills making cotton duck is one of the policies marked out in that direction, and it was followed only last year by the formation of two or three other mergers and plans for additional ones. These movements though natural as they may be and necessary to the maintenance of the industry in its already established centers, need not deter men from entering the territory not yet occupied or only tested thus far. Only time, wisdom, patience and energy are required to bring the Southern industry to the plane now occupied by the best New England mills of modern construction and modern equipment which are turning out the higher priced goods, and to the standing of the English industry which has to send across the seas for its raw material. The South has demonstrated that it can make good in this case.

Its advance to the place where it will be manufacturing the raw cotton into the higher class of goods more generally than it is doing at present can be made without crippling in any way the industry in the rest of the country or in other parts of the world. About 16,000,000 bales of cotton are required now for the yearly demands of the world. That demand must increase with the increase of population and with the stride of civilization across all parts of the globe. It will not be many years before the annual call will be for 25,000,000 bales of cotton. The South can bring itself to furnish its quota of the additional supply. But to derive the most benefit from the situation, the South must adopt such a wise and progressively conservative policy that, instead of shipping more than 80 per cent. of its crop to other parts of the world, it may be able to handle in its own mills a greater proportion than the 20 per cent. of the annual crop it now reserves for its own use. Into that policy enter the questions of sufficient capital, sufficient labor and control of large enough markets. If it pays spinners of fine yarns in Manchester, England, to become financially interested in 32,000 acres of cotton land in the Mississippi delta, it surely ought to pay capital nearer home to be like-minded on a larger scale and to enjoy the economy of manufacturing the cotton as close as possible to the plantation, whether in Mississippi, South Carolina, Texas, Louisiana or Oklahoma, and of making only one shipment, that of the finished goods to market. Such economy, added to that of the mechanical harvesting of the crop, which is destined to be a practical fact, and to that of more labor-saving machinery in the mills, will tend to give the manufacturers ability to offer the wages to attract workers from any quarter of the world. Nature, properly reinforced by human wisdom, will do the rest.

Phases of the Growth of Southern Population



THREE of the striking facts of modern Southern history are the notable increase of production on a number of lines in that section in comparison with the increase of its population, the expansion of the urban population, and the increasing tendency of the negroes to scatter from the South into other parts of the country.

Between 1880 and 1910 the population of the South, including Missouri and Oklahoma, increased from 18,614,925 to 32,480,343, or by 13,865,418, equal to 74.5 per cent., while the population of the rest of the country increased at the rate of 87.2 per cent., from 31,780,994 to 59,491,923, or by 27,710,929. The disparity between these rates of increase is to be accounted for largely by the settlement, principally in parts of the country outside the South, of the great body of immigration from foreign countries and partly by the migration of Southern negroes to the North and West. Since 1880, with the total population of the country increasing at the rate of 82.5 per cent., and the population of the country, exclusive of the white foreign-born, increasing 79 per cent., the white foreign-born population has more than doubled, increasing at the rate of 103 per cent., with the 13,343,583 foreign-born, constituting in 1910 more than 14 per cent. of the total population of the country. Since 1880, with the negro population of the country increasing nearly 50 per cent. and the negro population of the South increasing 46 per cent., the negro population of the country outside the South has increased 87 per cent.

These figures should be borne in mind in considering the question of increase of population in the country, and especially in comparison of that increase with the increases in Southern production.

Against the increase of 74.5 per cent. in the population of the South there have been increases of 1699 per cent. in the value of mineral production, of

divide the energies of its population and to train up, almost unaided, its workers in practically novel enterprises. At times acute situations have arisen. A short crop of cotton one year, with the consequent good price, has beguiled from the cotton mills hundreds of workers back to the little patches of land they had tended before a year of low-priced cotton sent whole families to the manufacturing centers. The establishment of a big lumber camp or a construction undertaking, with wages in ready money and with a letting down of personal responsibility, has drawn the negro laborers from the farms, and the growth of cities, affording a diversity of chances for employment in personal service of one kind and another, has contributed to the unevenness of Southern advance in production as a whole.

Manufacturing accounts for much of the increase in the urban population. In 1880 there were but 16 cities in the South having more than 25,000 inhabitants. Only five of those cities had a population greater than 100,000—St. Louis, with 350,518; Baltimore, with 332,313; New Orleans, with 216,090; Washington, including Georgetown, with 159,871, and Louisville, with 123,758. By 1910 the number of cities in the South having a population of more than 100,000 had increased to 11, and they were St. Louis, 687,029; Baltimore, 558,485; New Orleans, 339,075; Washington, 331,069; Kansas City, 248,381; Louisville, 223,928; Atlanta, 154,839; Birmingham, 132,685; Memphis, 131,105; Richmond, 127,628, and Nashville, 110,364. In the meantime 48 Southern cities had increased their respective populations beyond the 25,000 class, and their aggregate population was 4,748,340, an increase in 30 years of 2,781,131, equal to 142 per cent. Their aggregate population was 59.8 per cent. of the urban population of the South, that is, of cities having each more than 25,000 inhabitants. In 1900 the population of cities having more than 25,000 inhabitants

INCREASE IN POPULATION OF THE SOUTHERN STATES.

States.	1880	1890.	Increase Per Cent., 1880-90.	1900.	Increase Per Cent., 1890-00.	1910.	Increase Per Cent., 1900-10.	*1911.
Alabama	1,262,505	1,513,401	19.9	1,828,697	20.8	2,138,093	16.9	2,172,900
Arkansas	802,525	1,128,211	40.5	1,311,564	16.3	1,574,449	20.	1,604,000
District of Columbia ..	177,624	230,392	29.7	278,718	21.	331,069	18.8	336,900
Florida	269,493	391,422	45.2	528,542	35.	752,619	42.4	777,900
Georgia	1,542,180	1,837,353	19.1	2,216,331	20.6	2,609,121	17.7	2,654,100
Kentucky	1,648,690	1,858,635	12.8	2,147,174	15.5	2,289,905	6.6	2,305,900
Louisiana	939,946	1,118,588	19.	1,381,625	23.5	1,656,388	19.9	1,687,300
Maryland	934,943	1,042,390	11.5	1,188,044	14.	1,295,346	9.	1,307,400
Mississippi	1,131,597	1,289,600	13.9	1,551,270	20.3	1,797,114	15.8	1,824,800
Missouri	2,168,380	2,679,185	23.6	3,106,665	16.	3,293,335	6.	3,314,300
North Carolina	1,399,750	1,617,949	15.6	1,893,810	17.1	2,206,287	16.5	2,241,400
Oklahoma	76,585	258,657	237.6	790,391	205.6	1,657,155	109.7	1,756,200
South Carolina	995,577	1,151,149	15.6	1,340,316	16.4	1,515,400	13.1	1,535,100
Tennessee	1,542,359	1,767,518	14.6	2,020,616	14.3	2,184,789	8.1	2,203,300
Texas	1,591,749	2,235,527	40.4	3,048,710	36.4	3,896,542	27.8	3,992,900
Virginia	1,512,565	1,655,980	9.3	1,854,184	12.	2,061,612	11.2	2,084,900
West Virginia	618,457	762,794	23.3	958,800	25.7	1,221,119	27.4	1,250,600
Total	18,614,925	22,538,751	21.1	27,445,457	21.8	32,480,343	18.3	33,049,900
United States	50,395,919	62,947,714	24.9	75,994,575	20.7	91,972,266	21.	93,960,000

*Estimated.

458 per cent. in lumber production, of 489 per cent. in the value of manufactured products, and of 290 per cent. in the value of agricultural products.

In the rest of the country the increase of 87.2 per cent. in the population has been accomplished by increases of 349 per cent. in the value of mineral products, of 32 per cent. in the lumber output, of 328 per cent. in the value of manufactured products, and of 315 per cent. in the value of agricultural products.

It is obvious that the population of the South has accomplished much more in material production in proportion to its numbers than the population of the rest of the country, and that, too, in spite of the presence in the South of nearly 9,000,000 of a race which, as a race, is not as efficient in many particulars as it was 50 years ago, and notwithstanding the influences of the first half of the 50-year period which sent between 2,000,000 and 3,000,000 of the white population, largely the younger men, of the South to other parts of the country seeking opportunities superior to those that the South then offered in its crippled and harassed condition, but not to be compared with the calls of the South today to energy and enterprise. These two factors, added to the habit of home-seeking immigrants to follow generally parallels of latitude in moving from one country to another, which was one of the bars against the South's receiving many of the foreigners who flocked from Northern Europe in the years before 1890, left the South without its full equipment for making the most of the potentialities in its vast natural resources.

That its agricultural progress has hardly kept pace with that of the rest of the country is not because of any deficiency in fertility of soil or in beneficence of climate. There the South has advantages over other parts of the country. But much of the agriculture has been in the hands of negroes whose training in agricultural production was interrupted by the war and who cannot compete with whites on the farm. Then, recruits for mining operations, for lumbering, for railroad construction or for manufacturing did not come from abroad, but were drafted largely from the fields.

Demands of the world upon Southern resources came with a rush. The resources were there, but to make them available the South was obliged to

in 1910 had constituted 60.4 per cent. of the urban population of the South. In 10 years the urban population had increased 38.3 per cent. in the South and 34.2 per cent. in the rest of the country, and between 1890 and 1910 this class of the population had increased 96.1 per cent. in the South and 85.7 per cent. in the rest of the country.

Nearly 47 per cent. of the population of the country in 1910 was urban. The percentage of urban population in the South was only 24.4 per cent., and, with the exception of Maryland, where the population of Baltimore city alone constitutes more than 43 per cent. of the State's population, there were only three States in that section that had a proportion of urban population greater than the average proportion for the whole section. Those States are Missouri, with 42.5 per cent. of its population urban; Louisiana, with 30 per cent. urban, and Florida, with 29.1 per cent. urban. Maryland's percentage of urban population, 50.8, was the only percentage among the Southern States higher than the average percentage for the country.

A number of flourishing Southern cities were not on the map in 1880. The increases of population in some of them were due partly to the annexation of adjacent areas, but some of them have developed from the fields and prairies. Muskogee and Oklahoma City in Oklahoma, for instance, growths of less than 25 years, had an aggregate population of 89,483 in 1910, an increase in 10 years of 75,192, or at the rate of nearly 526 per cent. Among the notable increases in 30 years in cities that had in 1910 more than 25,000 inhabitants each were those of 5263.9 per cent. at El Paso, Tex.; 5250.5 per cent. at Tampa, Fla.; 5112.8 per cent. at Roanoke, Va.; 4199.5 per cent. at Birmingham, Ala.; 1000.3 per cent. at Fort Worth, Tex.; 888.7 per cent. at Huntington, W. Va.; 789.1 per cent. at Dallas, Tex.; 655.6 per cent. at Jacksonville, Fla.; 439.7 per cent. at Springfield, Mo.; 379.4 per cent. at Charlotte, N. C.; 377.2 per cent. at Houston, Tex.; 370 per cent. at San Antonio, Tex.; 355.7 per cent. at Joplin, Mo.; 345.2 per cent. at Kansas City, Mo.; 313.9 per cent. at Atlanta, Ga.; 290.2 per cent. at Memphis, Tenn.; 274.9 per cent. at Knoxville, Tenn.; 262.2 per cent. at Waco, Tex.; 249.7 per cent. at Shreveport, La.; 249.6 per cent. at Little Rock, Ark., which would show a greater percentage of increase

had not Argenta, included with the city in 1900, been separately enumerated in 1910; 245.9 per cent. at Chattanooga, Tenn.; 218.9 per cent. at Macon, Ga., and 207 per cent. at Norfolk, Va.

Expansion in the urban population reflects in some degree the townward drift of the negroes halting on their way to other parts of the country. Of the 4,441,730 negroes in the United States in 1860 only 5.5 per cent., or 247,558, were living outside the area now embraced in the South. By 1880 there had been but a slight change in the situation, the 507,982 negroes outside the South constituting 7.7 per cent. of the total. There was an apparent halting within the next 20 years, which placed outside the South 780,488, or 8.8 per cent. of the 8,833,994 negroes of the country. In the next 10 years the number of negroes outside the South increased to 952,633, and constituted 9.7 per cent., or nearly a tenth of the 9,828,294 in the United States. Between 1880 and 1910

tions still maintained in limited quarters among desirable whites of other sections to making their homes in the South. To be sure, these objections have become weaker and weaker as in increasing numbers thrifty men have moved to the South and have learned that there are vast areas there where the negro is hardly ever seen, and that there are other areas in which the number of negroes are becoming of less consequence in the population.

Negroes outnumbered the whites in Louisiana, Mississippi and South Carolina in 1890. Ten years later the negroes had become a minority in the population of Louisiana, and by 1910 the proportion of negroes to whites, both in Mississippi and in South Carolina, had become much less than in 1900. Between 1900 and 1910 there were actual decreases in the negro population in Kentucky, Tennessee, Maryland and Missouri, and notably in Virginia and South Carolina, the rates of increase in that class of the population was far

THIRTY YEARS' GROWTH OF SOUTHERN CITIES.

(Having More Than 25,000 Inhabitants in 1910.)

	1880.	1890.	1900.	1910.	Percentage of Increase.		
					1880-90.	1890-00.	1900-10.
Atlanta, Ga.	37,409	65,533	89,872	154,839	75.2	37.1	72.3
Augusta, Ga.	21,891	33,300	39,441	41,040	52.1	18.4	4.1
Austin, Tex.	11,013	14,575	22,258	29,860	32.4	52.7	34.2
Baltimore, Md.	332,313	434,439	508,957	558,485	30.7	17.2	9.7
Birmingham, Ala.	3,086	26,178	38,415	132,685	748.2	46.7	245.4
Charleston, S. C.	49,984	54,955	55,807	58,833	9.9	1.6	5.4
Charlotte, N. C.	7,094	11,557	18,091	34,014	62.9	56.5	88.
Chattanooga, Tenn.	12,892	29,100	30,154	44,604	125.7	3.6	47.9
Columbia, S. C.	10,036	15,353	21,108	26,319	52.9	37.5	24.7
Covington, Ky.	29,720	37,371	42,938	53,270	25.8	14.9	24.1
Dallas, Tex.	10,358	38,067	42,638	92,104	267.5	12.	116.
El Paso, Tex.	736	10,338	15,906	39,279	1,304.6	53.9	146.9
Fort Worth, Tex.	6,663	23,076	26,688	73,312	246.3	15.7	174.7
Galveston, Tex.	22,248	29,084	37,789	36,981	30.8	29.9	*2.1
Houston, Tex.	16,513	27,557	44,633	78,800	66.9	62.	76.6
Huntington, W. Va.	3,174	10,108	11,923	31,161	218.4	18.	161.4
Jacksonville, Fla.	7,650	17,201	28,429	57,699	124.9	65.3	103.
Joplin, Mo.	7,038	9,943	26,023	32,073	41.2	161.7	23.2
Kansas City, Mo.	55,785	132,716	163,752	248,381	137.9	23.4	51.7
Knoxville, Tenn.	9,693	22,535	32,637	36,346	132.5	44.8	11.4
Lexington, Ky.	16,656	21,567	26,369	35,099	29.5	22.3	33.1
Little Rock, Ark.	13,138	25,874	38,307	45,941	96.9	48.1	19.9
Louisville, Ky.	123,758	161,129	204,731	223,928	30.2	27.1	9.4
Lynchburg, Va.	15,959	19,709	18,891	29,494	23.5	*4.2	56.1
Macon, Ga.	12,749	22,746	23,272	40,665	78.4	2.3	74.7
Memphis, Tenn.	33,592	64,495	102,320	131,105	91.9	58.6	28.1
Mobile, Ala.	29,132	31,076	38,469	51,521	6.7	23.8	33.9
Montgomery, Ala.	16,713	21,883	30,346	38,136	30.9	38.7	25.7
Muskogee, Okla.	.....	.....	4,254	25,278	.....	.....	494.2
Nashville, Tenn.	43,350	76,168	80,865	110,364	75.7	6.2	36.5
New Orleans, La.	216,090	242,039	287,104	339,075	12.1	18.6	18.1
Newport, Ky.	20,433	24,918	28,301	30,309	21.9	13.6	7.1
Norfolk, Va.	21,966	34,871	46,624	67,452	58.8	33.7	44.7
Oklahoma City, Okla.	.....	4,151	10,037	64,205	.....	141.8	539.7
Portsmouth, Va.	11,390	13,268	17,427	33,190	16.5	31.3	90.5
Richmond, Va.	63,600	81,388	85,050	127,628	27.9	4.5	50.1
Roanoke, Va.	669	16,159	21,495	34,874	2,300.5	33.	62.2
St. Joseph, Mo.	32,431	52,324	102,979	77,403	61.3	96.8	*24.8
St. Louis, Mo.	350,518	451,770	575,238	687,029	28.8	27.3	19.4
San Antonio, Tex.	20,556	37,673	53,321	96,614	83.3	41.5	81.2
Savannah, Ga.	30,709	43,189	54,244	65,064	40.6	25.6	19.9
Shreveport, La.	8,009	11,979	16,013	28,015	49.5	33.7	75.
Springfield, Mo.	6,522	21,850	23,267	35,201	235.	6.5	51.3
Tampa, Fla.	720	5,532	15,839	37,782	682.2	186.3	138.5
Waco, Tex.	7,295	14,445	20,686	26,425	98.	43.2	27.7
Washington, D. C.	159,871	230,392	278,718	331,069	44.1	21.	18.8
Wheeling, W. Va.	30,737	34,522	38,878	41,641	12.3	12.4	7.1
Wilmington, N. C.	17,350	20,056	20,976	25,748	15.6	4.6	22.7
Total	1,959,209	2,828,150	3,564,180	4,740,340	44.3	25.9	33.1

In considering this table certain facts must be kept in mind. The decrease at Galveston, Tex., is traceable to the loss of several thousand lives in the disaster 11 years ago. The 1910 figures of Little Rock, Ark., do not include the figures of Argenta, which were included in the Little Rock figures of 1900. Roanoke, Va., was the town of Big Lick in 1880. The Washington figures of 1880 include the figures of Georgetown, Washington city now including the District of Columbia.

*Decrease. †As of April 15.

the number of negroes in the South increased 46 per cent. and in the whole country nearly 50 per cent., while the number outside the South increased 87 per cent.

Since 1860 the increase of the negroes had been less than 112 per cent. in the South, but more than 280 per cent. in the rest of the country. The 1,000,000 negroes in other parts of the country have been efficient agencies in bringing about a proper sense of the problem which has hampered the South, and the removal of that number of negroes from the South points to a greatly accelerated persistence of the movement. Results will be to the advantage both of the negro and of the South in substituting knowledge and practical common sense for theory and sentimentality in the handling of the negro race, on the one hand, and, on the other hand, and consequently, in removing objec-

below the birth rate. The manifestations in these 10 years point to a movement of the negro population within the South toward sections where new developments on a large scale call for common labor—a movement temporary in its character, but contributing indirectly to another movement of negroes to States outside the South for permanent residence destined to become greater and greater in volume and more and more potent as a factor in reducing to the minimum the phases of the negro problem that have made the negro an incubus upon the South.

The passing of this incubus clears the way for an increase in the number of white settlers in the South from other parts of the country and from among immigrants from abroad who are capable of being assimilated into the population of America.

Wealth in the Waters of the South



EW persons probably are aware that the waters of the South, its great Chesapeake Bay, its Albemarle, Pamlico, Mississippi and other sounds, its many inlets and bayous, and its mighty rivers, so potent in the commerce of the country, are direct wealth producers to the extent of nearly \$18,000,000 annually through the fisheries.

The total value of the products of the country's fisheries in 1908, the last year for which the figures are available, was \$54,031,000. To that total the South contributed \$17,836,300, or 33 per cent. But between 1880 and 1908 Southern fisheries had expanded at a much more rapid rate than those of the rest of the country. The number of employees in Southern fisheries increased from 57,549 to 75,916, or by 18,417, equal to 31.2 per cent., the capital invested in vessels, boats, apparatus, or otherwise, from \$9,497,306 to \$11,734,650, or by \$2,237,344, equal to 23.5 per cent., and the value of products from \$10,830,281 to \$17,836,300, or by \$7,006,019, equal to 64.7 per cent. In the rest of the country the number of employees had decreased from 73,877 to 67,965, or by 5,912, equal to 8 per cent., and the capital had increased from \$28,458,043 to \$30,285,350, or by \$1,827,307, equal to 6.4 per cent., and the value of the products from \$32,215,772 to \$36,194,700, or by \$3,978,928, equal to 12.3 per cent. The increase in capital in the South was 55.4 per cent. of the increase in capital in the whole country, and the increase in the value of products in the South was 63.8 per cent. of the increase in the whole country.

Every Southern State with the exception of Maryland showed increases in the number of employees, the capital invested and the value of the products of the fisheries. Florida, which has the longest coast-line of any State in the Union, 450 miles on the Atlantic Ocean and 675 miles on the Gulf of Mexico, had the greatest increase in capital from \$406,117 to \$2,415,000, and in the value of products from \$643,227 to \$3,389,000, but Maryland's fishery capital was reduced from \$6,342,443 to \$2,100,000 and the value of the products, from \$5,221,715 to \$3,306,000, placing the State fourth among the States of the South in 1908 in the amount of such capital and products, Virginia being first with \$2,984,000 of capital and \$4,716,000 of value of products, which was more than a quarter of the value in the whole South.

The decline in Maryland followed quite closely the falling off in the quantity of oysters taken from 10,600,000 bushels valued at \$4,730,000 to 6,232,000 bushels valued at \$2,228,000. In spite of intelligent and persistent work of recent years in the propagation of oysters under private auspices with notable success in some of the New England States, the Chesapeake Bay of Maryland and Virginia is still the center of the oyster industry, and it is producing nearly 50 per cent. of the total. The production of the country in 1908 was 33,330,000 bushels, valued at \$15,713,000, or 29 per cent. of the total value of all the fisheries of the country, and of the total 66 per cent., or 22,014,000 bushels were produced by the ten Southern States on the coast, Maryland leading, with 6,232,000 bushels and Texas being tenth, with 497,000 bushels. Virginia, Georgia, Texas and Louisiana are among the Southern States which have taken an advanced position in conserving and increasing the supply of oysters either through the State's cultivation of the public reefs, or through the foresight of owners of private grounds. In Louisiana the practice of relaying mature oysters has been found to improve their flavor and to increase their market value.

Of the 27,641,000 pounds of shad caught, six Southern States, Virginia, North Carolina, Florida, Maryland, Georgia and South Carolina, caught 73 per cent., or 19,826,000 pounds. And to the \$255,000 worth of the skins of musk rats, mink and other six States, Louisiana, Maryland, Florida, Missouri, Georgia and North Carolina, contributed \$189,100, or 74 per cent., while Florida alone produced all the sponges of the country, valued at \$545,000.

This sponge industry, in which Florida has a monopoly in this country, represented in its output's value only about a sixth of the value of the State's fisheries, but in taking of 622,000 pounds of sponges, an increase since 1880 of 415,000 pounds, \$439,000 were invested in vessels, boats and other outfits, and 2,097 persons were employed, or nearly a quarter of the total in all the fisheries of the State, and 318 sailing vessels, 132 diving boats, two motor boats and 723 other boats.

Florida, too, leads the country in the number of alligators killed, the product of 1908 having been 51,000 hides, an increase of 20,000 hides over 1902, and their value was \$48,000. Of the total catch of menhaden, 394,776,000 pounds, or more than a fifth of the quantity of fish caught in the country, three States, Virginia, North Carolina and Maryland caught 259,794,000 pounds, or 66 per cent.; of 89,978,000 pounds of alewives, the same three States caught 77,618,000 pounds, or 86 per cent.; of 60,626,000 pounds of crabs, Maryland and Virginia caught 45,456,000 pounds, or 76 per cent., and of 33,703,000 pounds of mullets, Florida, North Carolina, Alabama and Mississippi caught 32,353,000 pounds, or 96 per cent.

Virginia led the country in the catch of menhaden, 190,089,000 pounds, or

48 per cent. of the total; of alewives, 37,885,000 pounds, or 42 per cent. of the total; of crabs, 25,083,000 pounds, or 41 per cent. of the total, and of shad, 7,314,000 pounds, or 26 per cent. of the total.

Maryland, in spite of some neglect of a great opportunity, led in the production of oysters, with 43,600,000 pounds, or 19 per cent. of the total; Louisiana, in shrimp, 8,581,000 pounds, or 45 per cent. of the total, and catfish, 4,465,000 pounds, or 25 per cent. of the total, and Florida in mullets, 24,582,000 pounds, or 73 per cent. of the total, and red snappers, 8,061,000 pounds, or 58 per cent. of the total.

The aggregate of the catches of these products in the Southern States which led in that particular, was 476,671,000 pounds, or something more than 25 per cent. of the total catch of the country, which was 1,893,454,000 pounds, and to that total the South contributed 747,763,000 pounds, or nearly 40 per cent., divided among the States in the order of production, as follows: Virginia, 312,515,000 pounds; Maryland, 113,796,000; North Carolina, 101,422,000;

Florida, 74,087,000; Louisiana, 46,106,000; Mississippi, 20,547,000; Georgia, 14,828,000; South Carolina, 14,104,000; Arkansas, 12,567,000; Alabama, 10,665,000; Texas, 10,439,000; Missouri, 6,761,000; Kentucky, 5,390,000; Tennessee, 4,506,000; West Virginia, 33,000, and Oklahoma, 7,000 pounds.

In the value of the products of the fisheries, Virginia ranked second among the States of the country, Florida fifth, Maryland sixth, North Carolina eleventh, Louisiana thirteenth, Georgia nineteenth, Mississippi twentieth, Texas twenty-third, Alabama twenty-fourth, Missouri twenty-fifth, South Carolina twenty-sixth, Arkansas twenty-ninth, Tennessee thirty-first, Kentucky thirty-second, West Virginia thirty-seventh and Oklahoma thirty-eighth.

The \$18,000,000 worth of products of Southern waters are, of course, primarily for food and go directly to the consumer. But some of them are the basis of manufacturing industries of

considerable proportions. For instance, the sponges of Florida and the whales occasionally caught in that State and North Carolina waters, together with alligator hides, and the furs of other amphibia have their place in commerce and industry, and the menhaden, the fish found most abundantly in American waters and contributing 394,776,000 pounds, or more than one-fifth to the total catch, while used for food and as a bait for other fish, is principally valued as the source of oil and material for fertilizers, while "fish meal" for domestic animals is also derived from it.

Mussels, found in the waters of the tributaries of the Mississippi river, in Arkansas, Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, Tennessee and Wisconsin, were formerly sought for their pearls, some of which have great value. But within the past twenty years their shells have been used in the manufacture of buttons and now there are about fifty factories handling them. However, with a growing realization of the importance of these mollusks in States where most of them have been caught, the South has been rather slow in utilizing them. Of the 81,869,000 pounds of mussels caught in 1908, but 17 per cent., or 13,813,000, were caught in four Southern States, Arkansas, with 8,060,000 pounds; Kentucky, 3,413,000 pounds; Tennessee, 2,170,000 pounds, and Missouri, 170,000 pounds. The possibilities of the waters in the first three of these States, though, are emphasized by recent investigations by the National Bureau of Fisheries and the planting of some of the best species in the Cumberland River.

Oyster shells are used in the manufacture of lime to the extent of about 25,000 tons, valued at \$80,000, annually. But the main industry into which the oysters enter is canning and preserving. Of the total capital in the United States in that industry, \$2,600,000, nearly 80 per cent., or \$2,000,000 are in Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina and South Carolina. Only a comparatively small share of the fish canning of the country is had by the South, and four States, Louisiana, Maryland, Mississippi and Virginia, have but about \$600,000 of the total \$20,000,000 capital invested in it. But \$478,723 of the \$478,931 value of products of the shrimp canning are furnished by Louisiana and Mississippi.

Fisheries, for food or for manufacturing, may be exhausted, and the present status of the oyster in some of the waters which are its peculiar natural habitat suggests misfortunes of the future as to water products generally, unless corrective measures be adopted.

That is being done to some extent, not only in the case of oysters, but for shad and other fish by the Federal Government, by some of the States and by individuals. This policy should be maintained and expanded so as to assure a supply of sea-food adequate to the needs of the increasing population of the country.

GROWTH OF SOUTHERN FISHERIES.

States.	Employees.		Capital.		Products.	
	1880.	1908.	1880.	1908.	1880.	1908.
Ala...	635	972	\$38,200	\$269,000	\$119,275	\$387,000
Ark...	...	998	...	89,100	...	207,000
Fla...	2,480	9,212	406,117	2,415,000	643,227	3,389,000
Ga...	899	2,525	78,770	409,000	119,993	701,000
Ky...	...	555	...	38,000	...	110,000
La...	1,597	5,795	93,621	930,000	392,610	1,569,000
Md...	26,008	18,392	6,342,443	2,100,000	5,221,715	3,306,000
Miss...	186	2,037	8,800	522,000	22,540	556,000
Mo...	...	906	...	91,000	...	271,000
N. C...	5,274	9,681	506,561	1,270,000	845,695	1,776,000
Okl...	...	3	...	50	...	300
S. C...	1,005	2,559	66,275	113,400	212,482	288,000
Tenn...	...	427	...	49,400	...	112,000
Texas...	601	1,780	42,400	453,000	128,300	446,000
Va...	18,864	20,066	1,914,119	2,984,000	3,124,444	4,716,000
W. Va...	...	8	...	1,100	...	2,000
Total	57,549	75,916	\$9,497,306	\$11,734,650	\$10,830,281	\$17,836,300
U. S.	131,426	143,881	\$37,955,349	\$42,020,000	\$43,046,053	\$54,031,000

The South Needs More Livestock



THOUGH in a few Southern States greater attention may now be given to the raising of livestock than was the case thirty years ago, that occupation has made little progress for the South as a whole, even if it has not actually tended to decline. To be sure, the value of domestic animals, poultry, etc., in the South increased between 1900 and 1910 from \$967,217,715 to \$1,589,240,320, or by \$622,022,605, equal to 64.3 per cent., which was a greater increase than the 56.8 per cent. in the rest of the country representing \$1,197,793,911, the difference between \$2,107,914,551 and \$3,305,708,462 in 1910. These figures reflect the advance in prices of the past decade, but indicate at the same time the swifter movement in the South toward better stocking of farms and toward a better balance in farm operations.

Neither in the South nor in the rest of the country has livestock raising kept pace with the growth of population. Between 1880 and 1890 the population of the South increased 21.1 per cent. and the number of cattle increased from 14,189,000 to 17,769,568, or at the rate of 25.2 per cent. In the next ten years the population increased 21.8 per cent. and the number of cattle 41.4 per cent., from 17,769,568 to 25,224,000. The basis of comparison in livestock be-

This slight advantage as to the South, compared with the rest of the country, appears also in the case of swine, though both in the South and in the rest of the country there was a decline in the number of swine in proportion to the population, in the South the number decreasing from 11.3 to 6.9 to each inhabitant, and in the rest of the country from 8 to 5.9 to each inhabitant. The increase in number was from 21,132,000 to 22,675,373, or by 1,543,373, equal to 7.3 per cent. in the South, and from 26,550,000 to 35,325,259, or by 8,775,259, equal to 33 per cent. in the rest of the country.

Complete figures by decades for sheep are hardly available, but those at hand indicate a decline in their number between 1880 and 1910 of 15.9 per cent. in the South and an increase of 34.7 per cent. in the rest of the country.

The tendency as to livestock generally is revealed in some facts about cattle. There was an increase in their number in the thirty years all through the South, but of the total increase of 7,489,502 in that section more than 50 per cent., or 4,040,560, was in Texas and Oklahoma, and the 1910 figures showed in Texas 2,766,498 and in Oklahoma 1,349,942 fewer than in 1900.

There were decreases in the number of swine between 1880 and 1910 in eight Southern States, especially in Kentucky and Tennessee, and the in-

LIVESTOCK IN THE SOUTH

1880 (June 1).			
States.	Cattle.*	Sheep.†	Swine.
Alabama	675,000	347,000	1,252,000
Arkansas	682,000	247,000	1,565,000
Florida	451,000	106,000	287,000
Georgia	860,000	527,000	1,471,000
Kentucky	807,000	1,000,000	2,225,000
Louisiana	428,000	136,000	633,000
Maryland	240,000	171,000	335,000
Mississippi	655,000	288,000	1,152,000
Missouri	2,072,000	1,411,000	4,553,000
North Carolina	607,000	462,000	1,454,000
Oklahoma	546,000	55,000	.....
South Carolina	339,000	119,000	628,000
Tennessee	756,000	673,000	2,160,000
Texas	3,994,000	3,651,000	1,950,000
Virginia	631,000	497,000	956,000
West Virginia	446,000	675,000	511,000
Total	14,189,000	10,365,000	21,132,000
United States	34,932,000	42,192,000	47,682,000

*Includes milch cows. †Some spring lambs included.

1900 (June 1).			
States.	Cattle.*	Sheep.†	Swine.
Alabama	798,000	317,000	1,423,000
Arkansas	895,000	257,000	1,713,000
Florida	751,000	125,000	464,000
Georgia	899,000	336,000	1,424,000
Kentucky	1,083,000	1,297,000	1,955,000
Louisiana	670,000	220,000	788,000
Maryland	293,000	191,000	318,000
Mississippi	873,000	313,000	1,290,000
Missouri	2,979,000	1,087,000	4,525,000
North Carolina	625,000	302,000	1,300,000
Oklahoma	3,209,000	88,000	1,235,000
South Carolina	343,000	72,000	619,000
Tennessee	912,000	496,000	1,977,000
Texas	9,428,000	1,889,000	2,666,000
Virginia	826,000	693,000	946,000
West Virginia	640,000	969,000	443,000
Total	25,224,000	8,652,000	23,086,000
United States	67,719,000	61,504,000	62,868,000

*Includes milch cows. †Lambs not included.

1890 (June 1).			
States.	Cattle.*	Sheep.†	Swine.
Alabama	778,676	386,380	1,421,884
Arkansas	938,244	243,999	1,505,214
Florida	465,881	98,275	374,241
Georgia	824,818	440,459	1,396,362
Kentucky	1,007,165	937,124	2,036,746
Louisiana	539,128	186,167	569,935
Maryland	250,123	132,329	312,020
Mississippi	819,201	451,779	1,163,141
Missouri	2,955,710	950,562	4,987,432
North Carolina	572,711	402,247	1,251,006
Oklahoma	125,328	16,565	21,962
South Carolina	242,143	79,421	494,696
Tennessee	924,709	540,996	1,922,912
Texas	6,103,268	3,454,858	2,252,476
Virginia	495,763	495,313	796,691
West Virginia	536,700	785,063	411,018
Total	17,769,568	9,601,537	20,917,736
United States	50,246,078	35,935,364	57,409,583

*Includes milch cows. †Includes lambs.

1910 (April 15).			
States.	Cattle.*	Sheep.†	Swine.
Alabama	931,986	142,925	1,266,219
Arkansas	1,027,039	144,190	1,517,310
Florida	844,321	113,631	808,788
Georgia	1,077,776	187,589	1,780,618
Kentucky	999,553	1,361,000	1,490,316
Louisiana	803,942	178,217	1,326,482
Maryland	287,751	237,137	301,583
Mississippi	1,010,398	194,280	1,287,072
Missouri	2,556,420	1,808,038	4,429,429
North Carolina	700,208	214,176	1,226,307
Oklahoma	1,859,058	59,992	1,737,826
South Carolina	388,865	37,433	664,475
Tennessee	994,941	793,963	1,386,050
Texas	6,721,502	1,758,084	2,329,723
Virginia	858,185	803,552	796,730
West Virginia	616,557	906,093	326,445
Total	21,678,502	8,940,300	22,675,373
United States	61,225,791	51,809,068	58,000,632

*Includes milch cows. †Includes lambs.

tween 1900 and 1910 is defective because the figures of 1900 are as of June 1, while those of 1910 are as of April 15. They show a decrease of 14 per cent. in the number of cattle in the South. Bearing all these facts in mind, there is still manifest a marked difference between the increases in population and in the number of cattle between 1880 and 1910. In that period the population of the South increased from 18,614,925 to 32,480,343, or by 13,865,418, equal to 74.4 per cent., and the number of cattle increased from 14,189,000 to 21,678,502, or by 7,489,502, equal to 52.8 per cent. The showing made by the rest of the country was somewhat better, with the population increasing at the rates of 26.5 per cent., 20.1 per cent. and 22.5 per cent. in the three decades, respectively, and 87.1 per cent. in the thirty years, the number of cattle increased at the rate of 56.5 per cent. and 30.8 per cent. in the first two decades, respectively; decreased at the rate of 6.9 per cent. in the third decade and increased at the rate of 90.6 per cent. in the whole period. The actual increase in population in the rest of the country between 1880 and 1910 was from 31,780,994 to 59,491,923, or by 27,710,929, and the gain in the number of cattle was from 20,743,000 to 39,547,289, or by 18,804,289.

In 1880 the number of cattle was greater in proportion to the population than in 1910 in the South, and the same is true as to the rest of the country, but in both years the proportion was slightly greater for the South than for the rest of the country.

creases in the other States were 14,219 in Alabama, 521,788 in Florida, 309,618 in Georgia, 693,482 in Louisiana, 135,072 in Mississippi, 36,471 in South Carolina and 379,723 in Texas, while in Oklahoma, which did not appear in the figures of 1880, there was an increase of 502,826 between 1900 and 1910.

There were increases in the number of sheep in the thirty years in nine Southern States—7631 in Florida, 361,000 in Kentucky, 42,217 in Louisiana, 66,137 in Maryland, 397,038 in Missouri, 4992 in Oklahoma, 120,963 in Tennessee, 306,552 in Virginia and 231,093 in West Virginia, but the South as well as the country as a whole is not living up to its opportunities in sheep-raising. On April 1 of last year, of the 39,761,000 sheep of shearing age in the country, but 6,068,000 were in the South, and that number was 4,782,000 less than the total in Montana, Wyoming and Idaho. Ohio had four times as many sheep as Kentucky and nearly five times as many as West Virginia. Southern sheep produced wool which, when scoured, was valued at \$7,407,631, as against a value of \$45,043,746 in the rest of the country. But deeper practical interest in packing-houses in the South, which have already demonstrated in four or five States their great influence for the benefit of stock-raisers and better appreciation of the immediate value to the land in raising cattle and sheep, are sure to change conditions in the South. One of the most desirable changes will be a decrease in the amount of money sent from the South to purchase meats that the South may easily raise for itself.

Iron and Steel Interests of the South



IN 1880 the South produced 448,978 tons of pig-iron, or 11.7 per cent. of the 3,835,191 tons made in the country in that year. In 1910 the South made 3,447,291 tons, or 12.6 per cent. of the total production in the country, 27,303,567 tons. That year was a record-making one for pig-iron in the country, but the Southern production was 77,828 tons less than its record output of 3,525,119 tons in 1906, when it constituted 13.9 per cent. of the 25,307,191 tons in the country. In 1880 Pennsylvania produced 2,364,759 tons, or 61.6 per cent. of the country's output, but Pennsylvania's 10,621,081 tons of 1910 was only 38.9 per cent. of the country's output. Between 1880 and 1910 the country's output increased 612 per cent. and Pennsylvania's output, which leads the country, increased 349 per cent. In the same period the South's output increased 668 per cent. and the output of Alabama, leading in Southern production, increased 2713 per cent., and in the latter year the Southern production was within 387,900 tons of the country's production 30 years before. As a matter of fact, the great growth of the iron industry in this country has been since 1860, when less than 1,000,000 tons of pig-iron was made.

But the advance made by the South since 1880 should not obscure the fact that its iron industry of today is not a new creation; rather it is a revival of an industry which flourished in early colonial days, at a time when the South was a leader in iron-making in this country. As early as 1716 there were a number of iron-making enterprises in Virginia, and in 1727 the General Assembly of that State showed its appreciation of the importance of the industry by the adoption of "an act for encouraging adventures in iron works." In his "History of Iron in All Ages," James M. Swank, the veteran general manager of the American Iron and Steel Association, referring to the establishment of many charcoal furnaces and bloomeries in the Southern colonies, says:

"The people who built these furnaces and bloomeries were not only bold and enterprising, but they appear to have been born with a genius for making iron. Wherever they went they seem to have searched for iron ore, and having found it their small charcoal furnaces and bloomeries soon followed. No States in the Union have shown in their early history more intelligent appreciation of the value of an iron industry than North Carolina and Tennessee, and none have been more prompt to establish it. The enterprise of these early iron-workers assumes a picturesque aspect when viewed in connection with the primitive methods of manufacture which were employed by them. * * * About 1790 the iron industry of Virginia took a fresh start, as did many other manufactures in that State. * * * No State in the Union gave more attention to domestic manufactures after the close of the Revolution than Virginia. Richmond, Lynchburg, Staunton, Winchester and some other places became noted for the extent and variety of their manufactures."

South Carolina was an iron-producing State as early as 1773. Prior to 1825 there had been a considerable development in iron-making in the upper part of that State, and between 1825 and 1840 very considerable progress was made in the establishment of iron works, including furnaces, rolling mills and nail factories.

In a study of the iron development of the South during the last thirty years it is well to bear in mind the activity in iron production in early colonial days and during the first part of the nineteenth century, for throughout the South are to be found the descendants of the men who had "a genius for iron-making" and who have inherited from their forebears the ability to become metallurgical leaders.

After the development of cotton-growing on a large scale early in the nineteenth century, by reason of the great profit in this industry at prices then ruling, which concentrated the energy and capital of the South in agricultural pursuits rather than in industrial activities, there was a relative decline in the iron-making industry, as well as in other manufacturing pursuits for forty or fifty years. Not until about 1850 was there a marked return of the industrial spirit. Before great manufacturing interests could

be created the war came, and when it ended the South had been swept bare of almost every evidence of industrial life. Wrecked and ruined as the South was, it made but little progress for some years in the creation of a new iron industry. Shortly after the war a few far-seeing men, such as Abram S. Hewitt and others, made some investments in iron enterprises in the South, but so little was achieved that in 1880 the entire South made only 448,978 tons of pig-iron. About that time Alabama's iron-making possibilities, recognized thirty years before, began to attract marked attention in other parts of the country. Prior to the war Mr. Hewitt had been so greatly impressed with the advantages of that State, which were well known to its own people, and which to some considerable extent were being utilized through the establishment of a number of furnaces that he secured an option about 1857 upon a large part of the Red Mountain of the Birmingham district. He once said to the writer that the best report that had ever been made on the Birmingham district had been made for him in 1857. Signs of the coming civil strife caused Mr. Hewitt to abandon his idea of establishing iron works in Alabama. By 1880, with renewed developments in that section, predictions were freely made that it would become a great iron-making center. Virginia and other Southern States were by that time also showing considerable activity in the revival of the iron industry.

Between 1880 and 1885 there was a great burst of activity in iron interests, and the boom in the building of furnaces, often connected with land enterprises or town-building schemes, resulted in the construction of many furnaces in the South, some of them being badly located as to supplies of raw materials, and some having been built without sufficient capital to operate after construction. During the latter part of the decade of 1880-1890 this furnace-building activity was very pronounced, and in one year there were several times as many furnaces under construction in the South as in the rest of the country.

When the town lot boom, which was more active in the West and North-

west even than in the South, collapsed, as the Manufacturers Record and all thoughtful advisers had constantly predicted, many of these furnace enterprises were abandoned, while others passed into new hands at much less than the cost of construction. Prior to this collapse, pig-iron production in the South was increasing far more rapidly than in other sections, and there was a widespread belief in this section, as well as in the North, that the center of iron production was rapidly passing to the South. Some of the leading iron-masters of the country turned their thoughts southward and began the investigation of Southern iron ore properties. The largest steel-making concern in the Pittsburgh district employed a well-known geologist for a year or more to investigate the iron ore resources of the Virginias to see if a sufficient supply of ore could be found to justify the building of a railroad and the shipment of ore to Pittsburgh in order to meet the increasing demand in that section for iron ore, the supply of which was inadequate to the needs of the growing iron industry of Pittsburgh. While these investigations were under way the Mesaba district was opened up, and the whole situation suddenly changed. With the discovery of enormous supplies of high-grade iron ore in the Mesaba region, where by means of the steam shovel ore could for some years be put on the cars at very much less than the cost of mining at any point in the South, and sometimes estimated as low as 25 cents a ton, the South had to meet a new competition from a wholly unexpected source. In the early nineties a great rush to the Mesaba region took place. Ore-mining companies were organized, railroads built, steamship lines established, great piers and docks for the handling of ore constructed, and within a few years from the opening of the Mesaba district an enormous development had been brought about, and Pittsburgh, instead of ceasing to be the iron center of the country, as Mr. Carnegie had once predicted, had become fixed as the iron and steel center of the world for the time being.

SOUTHERN PIG IRON PRODUCTION.

(Tons of 2240 Pounds.)

States.	1880.	1890.	1900.	1910.
Alabama.....	68,919	816,911	1,184,337	1,939,147
Georgia.....	24,394	29,184	67,033	64,215
Kentucky.....	51,525	47,861	71,562	100,509
Maryland.....	54,854	147,821	290,073	326,214
Missouri.....	94,246	89,777	*	*
North Carolina.....	.....	2,841	*	*
Tennessee.....	63,279	267,626	362,190	397,569
Texas.....	2,232	9,701	10,150	.....
Virginia.....	26,727	292,778	490,617	444,976
West Virginia.....	62,802	129,437	166,758	174,661
Total.....	448,978	1,833,937	2,642,720	3,447,291
U. S.....	3,835,191	9,202,703	13,789,242	27,303,567

*Included with Georgia.

PRODUCTION OF PIG IRON.

(Tons of 2240 Pounds.)

Years.	The South.	United States.
1880.....	448,978	3,835,191
1881.....	519,053	4,144,254
1882.....	616,892	4,623,323
1883.....	716,567	4,595,510
1884.....	640,752	4,097,868
1885.....	682,359	4,044,526
1886.....	847,948	5,683,329
1887.....	953,642	6,417,148
1888.....	1,093,429	6,489,738
1889.....	1,475,796	7,603,642
1890.....	1,833,937	9,202,703
1891.....	1,738,194	8,279,870
1892.....	1,947,187	9,157,000
1893.....	1,599,659	7,124,502
1894.....	1,274,947	6,657,388
1895.....	1,729,606	9,446,308
1896.....	1,846,999	8,623,127
1897.....	1,937,229	9,652,680
1898.....	2,133,514	11,773,934
1899.....	2,398,881	13,620,703
1900.....	2,642,720	13,789,242
1901.....	2,626,387	15,878,354
1902.....	3,085,957	17,821,307
1903.....	3,287,522	18,009,252
1904.....	2,775,215	16,497,033
1905.....	3,279,370	22,992,380
1906.....	3,525,119	25,307,191
1907.....	3,493,772	25,781,361
1908.....	2,369,741	15,936,018
1909.....	3,188,091	25,795,471
1910.....	3,447,291	27,303,567
1911*.....	3,000,000	24,000,000
Total.....	63,156,754	394,183,920

*Estimated.

Under these conditions it was impossible for the South to secure new capital for its iron interests, and existing establishments had a hard struggle to keep out of bankruptcy. Coincident with this situation came the great depression in iron following the Baring failure, and running through the general business depression of 1893 to 1896. During these days the iron interests of the South halted. Nothing but the unflinching courage and the ability to make the best of a bad situation enabled the Southern iron industry to meet the overwhelming difficulties which it faced in low-priced iron, in inability to secure new capital to modernize its plants, and the terrific competition brought about by Mesaba ores, which made it possible to greatly reduce the cost of iron production in Pittsburgh and on the Lakes.

Through all of this period, as during the decade between 1880 and 1890, experiments were constantly being made in the Birmingham district to develop steel-making. The ownership by adverse interests of the basic steel patents for a long time made it impossible to bring about a satisfactory test of Alabama pig-iron for basic steel. After many experiments by independent companies formed to test different steel-making inventions, the Tennessee Coal, Iron & Railroad Co., largely through the co-operation and the financial backing of the railroads, established a basic steel plant. It demonstrated the suitability of Southern ores for making high-grade basic steel, but the amount of capital available was entirely too small to make of the enterprise a commercial success. Changes were made from time to time, but the lack of capital handicapped the full development of the steel-making interests. Shortly after the plant had proven by actual operations that the highest grade of steel could be made out of Alabama ores by the basic method, Mr. Abram S. Hewitt, in a statement made through the Manufacturers Record, predicted that Birmingham would dominate the basic steel industry of the world.

With the return of business prosperity after 1896 and a general revival of industrial activity throughout the country, new life was given to the iron interests of the South. About ten years ago a number of properties, long idle, were reorganized and a broader development begun of the entire iron-making resources of this section. Shortly after the turn of the century an effort was made to consolidate the leading iron companies of Alabama. While this was not successful, it resulted in attracting in New York and elsewhere great attention to the vast resources in iron ore and coal of the Birmingham region. A new recognition was secured for the iron interests of the South. This was followed by the purchase of the Tennessee Coal, Iron & Railroad Co. by a syndicate composed of John W. Gates and his associates. Prior to that time the stock of the Tennessee company had for fifteen or twenty years been a football in Wall Street speculation, kicked from pillar to post, and used to the advantage of some speculators who made more money out of the stock than the company had ever made out of its production of iron. In the purchase of the stock by Gates and his associates, a new era for the Tennessee company was opened. The development of the steel-making end of the property was undertaken on a large scale, and about \$7,000,000 or \$8,000,000 were expended within the next year or two. In the panic of 1907 some members of the syndicate controlling the situation being crowded by the financial conditions, a sale of the stock of the company to the United States Steel Corporation was effected. This marked an entire change in the whole situation. There had been much fear during the panic that the syndicate controlling the Tennessee would not be in position to continue its broad work, but when the United States Steel Corporation entered the district it was felt that at last the development of that region would be able to command the skill and the capital needed, commensurate with its unequalled natural advantages. This has proven true.

In the days when Andrew Carnegie was the dominant figure in the iron trade of the country, the question was repeatedly asked why, if the South has such great iron-making possibilities as have been claimed for it, does not Mr. Carnegie become identified with that section? There were reasons abundant why Mr. Carnegie was too fully absorbed in his Pittsburgh interests to undertake the development of another district, but the public could not be made to understand that situation. Later on, after the organization of the United States Steel Corporation, the same question was repeatedly asked as to why, if Alabama had the great advantages which it was said to possess, did not the Steel Corporation, with its vast capital, become interested in the development of iron and steel-making in that State? Any one familiar with the organization of the Steel Corporation knew that for the first few years of its existence it had many difficult problems to solve in rounding out its scattered operations, in putting its plants into first-class shape and developing its vast but widely scattered interests.

When the Steel Corporation did, however, enter the Alabama district, it forever answered these questions. Its investment in Alabama, including the bonds on the property of the Tennessee company when purchased, now amounts to about \$63,000,000, of which about one-fourth has been expended since the purchase of the Tennessee company in the development of that property. Within the comparatively brief period which the Steel Corporation has been in that district it has practically rebuilt the furnaces and the rail mill, making of them a thoroughly modern and up-to-date plant. It has opened new coal mines and new ore mines. It has re-equipped the mines that were in operation. It is building a by-product coke plant to produce about 3000 tons of coke a day. It has developed a water system for its own use, ample for the vast extension of its operations. It has expended nearly \$4,000,000 in the erection of enormous buildings intended for the production of wire by the American Steel & Wire Co., one of its subsidiaries. It has increased its holdings of lands suitable for the extension of its plants in the Ensley-Corey districts by several thousand acres, and has so rounded out its system that it is now prepared, when the business situation improves, to extend its operations on a scale vast enough to justify the investment already made and to utilize the almost limitless resources in coal and iron ore which it owns.

It has been estimated by experts that the Tennessee company has about 700,000,000 tons of ore and about 2,000,000,000 tons of coal. This, however,

is not a monopoly, as was for a time supposed by those who were not well informed. Expert reports, which are in harmony with the knowledge of all familiar with the district, were presented in the Manufacturers Record some months ago, showing that the Tennessee Coal, Iron & Railroad Co. owns at the outside only about 20 per cent. of the available ores of the South.

Developments in the Birmingham district tend to a rounding out of plants and the establishment of new ones so as to turn all of the pig-iron made there into finished products. It is fully recognized that this district has exceptional facilities for plants to make rails and other finished products for the export trade, and the Steel Corporation since its entrance into that field has been active in working up foreign markets for its Birmingham-made rails and pig-iron.

A few years ago a steel plant was built at Gadsden at a cost of about \$3,000,000. This will doubtless be increased in capacity by additional expenditures, making it one of the very important finished steel-making plants of the country. Negotiations have been under way for some months looking to the building of one or more steel plants in the Chattanooga district.

Nearly a quarter of a century ago the far-seeing men who controlled the Pennsylvania Steel Co. saw and seized the opportunity for building just below Baltimore at Sparrows Point a furnace and steel plant to use foreign ores and West Virginia coal for coke, having in mind the opportunity of reaching the Atlantic and Gulf coast as well as foreign countries by water transportation. The Maryland plant, operating as the Maryland Steel Co., has been steadily developed until it now includes not only its modern furnaces and up-to-date rail mill, but a by-product coke plant, a basic steel plant recently completed, and a shipyard which has become one of the foremost shipbuilding concerns in the country. A few years ago the parent company, the Pennsylvania Steel Co., secured in Cuba an iron ore property containing, according to the reports of experts based on thorough investigation, about 600,000,000 tons of ore. This property is being developed with a view to supplying ore to the Sparrows Point plant.

Investigations made during the last year or two have demonstrated a supply of ore in Texas sufficient in the opinion of experts to justify the building of a steel plant in that State. Properties in Eastern Texas, controlled by the East Texas Brown Ore Co., are being developed on a large scale, and railroad facilities have been recently provided for the shipping of these ores to Port Bolivar, on Galveston Bay, with a view to making it feasible to furnish them to Atlantic coast furnaces. A number of contracts for shipment have already been made, but the owners of the property have in view the construction at Port Bolivar of a furnace and steel plant, and this will probably be carried out in the not distant future. Another strong company composed of iron and steel men in the East and Texas bankers is now developing a property in East Texas upon which very large deposits of high-grade brown ore have been fully proven. In that portion of Texas are 17,000 square miles underlain with ore, held to be exceptionally adapted to the manufacture of basic pig-iron. A shipment of about 600 tons of this ore to Philadelphia showed more than 57 per cent. of metallic iron and the phosphorous content was not more than one-fifth of 1 per cent. Experts consider that the scraper process may be advantageously used in mining this ore at a lower cost even than steam shovel mining. Pig-iron has been made in Texas under State auspices, but the lack of success thus far is attributed to poor management, under the circumstances, and not to the character of the ore. The quantity and the quality of the ore being assured, the question of the establishment of a great iron and steel industry in Texas turns upon the supply of fuel. Great as are the known mineral resources of Texas, it is reasonable to believe that their full possibilities are not yet known, and the abundance of lignite and low-grade coal in the State is a good basis for belief that a good coking coal may ultimately be uncovered there. Certainly the plan of furnaces on the coast using coke brought from other States is quite feasible.

In West Virginia great advance has been made of recent years in steel-making, and that State is the center of very large steel-making interests.

From now on the progress of iron and steel-making in the South should be in keeping with the anticipations of those who between 1880 and 1890, before the Mesaba discovery, were vigorously doing the pioneer work in the development of iron-making in the South, which had been so nearly destroyed by the war. This section has now passed through the hard trials of pioneer days. It has demonstrated under the most adverse conditions, financial and industrial, its remarkable iron and steel-making advantages. As Pennsylvania prior to 1860 had several decades of hard times and pioneering work in iron and steel, when its iron-making interests were without financial credit and failures were common, so the South had to pass through a similar stage. It has successfully weathered all the financial and industrial storms, met the competition of the Mesaba district, and now, backed as its iron and steel interests are with vast capital and with the command of the highest technical skill, is certain to make very rapid progress.

Between 1880 and 1890 the iron production of the South more than quadrupled, rising from 448,978 tons to 1,833,937 tons. While the aggregate increase in each decade since has exceeded 800,000 tons, the rate of increase has been very much less than between 1880 and 1890. This section is now making almost as much iron as the United States made in 1880, but with the world's increasing demand for iron and steel, with the marvelous expansion of wealth, commerce and trade in the South and in the regions of the world which can be reached through Southern ports, it is quite within reason to look for an increase in the output of Southern iron and steel within the next ten years several times greater than in the increase in the last ten. In fact, it is not unreasonable to anticipate that the increase in the South's output in ten years will exceed the increase during the last twenty years, which would give this section ten years hence a production of about 6,000,000 tons. A much larger development is possible.

Mineral Industries of the South



TRADITION hath it that a nugget of gold from Louisa county, Virginia, was one of the largest, if not the largest, of the nuggets exhibited at the Philadelphia Exposition of 1876. That nugget was a specimen of the mineral wealth which had been such a lure in the voyages of discovery that led to the settlement of America by the English and an inspiration to trips of exploration up the Potomac River and beyond the Falls of the James after the founding of Jamestown.

Obsession as to the importance of the precious metals gradually was overcome by the determination to use baser materials in the derivation of wealth, and although the colonists in this country mistook the glitter in comparatively worthless sand for gold, their descendants have discovered and have acted upon the discovery that, while all that glitters may not be gold, some things that glitter may be of more economic value than the gold.

The interesting fact remains, however, that within less than thirty years ahead of the Philadelphia exhibit a large part of the native gold coined in this country had been mined in the South, leading to the establishment in that section of branch mints.

But that Virginia nugget came from a region containing not only gold, but lead, copper, iron ore and other minerals. There iron ore had been mined in the surface pits before the War and for 10 years after the War copper had been mined beneath the iron ore. The enterprise finally was concentrated upon the mining of iron pyrites, and the mines there are now more productive than any other of the kind in this country.

In that is typed the change that has come in the mineral industries of the South as a whole in which the coal produced annually has a greater value than the aggregate value of the gold and silver mined in the United States, including Alaska.

Virginia was premier in bituminous coal production in this country, and that State, with Maryland, Missouri, Kentucky, Georgia, Arkansas, Tennessee and Alabama—were mining coal in 1860. Before the middle of the last century coal fields had been traced along both sides of the Arkansas River from a point 40 miles above Little Rock to beyond the western limits of Arkansas, and the coal was used in households of Little Rock and by local blacksmiths. As early as 1834 Alabama was using its coal, and the head of navigation in the Warrior River in that State was a coal bed forming an obstruction in the channel. Professor Tuomey, the State geologist, noted in 1850 occurrences of many minerals and gave some details about the Benton Iron Works, in Benton county, and its operations for several years, and quoted the following from one of its proprietors:

"We have a blast furnace, a puddling furnace and forge in operation. We turn out daily about 6000 pounds, 2000 pounds of which are put into hardware and machinery castings, 2000 pounds into bar iron and 2000 pounds into pigs. We use 600 bushels of charcoal every 24 hours. Our iron-ore beds (some of them) are within 600 yards of the furnace. Our limestone is at the furnace, and in abundance. The nearest stone coal beds that we have worked are 13 miles off. We are now preparing to put up a rolling mill, and think that in a short time we shall be able to roll iron successfully. Our establishment is five miles east of the Coosa River, opposite the Ten Islands, and 11 miles from Greensport. We ship our iron down the Coosa in flat boats to Wetumpka, Montgomery and Mobile. We have found the articles we produce here of a ready sale in either of those markets. We are prepared to make, turn off and fit up all kinds of machinery except fine castings for cotton mills, and will very soon be ready to furnish these."

The operations here described were a microscopic prophecy of the industrial life centering in Alabama now, based upon the mineral resources of that region, and of the broader development in the whole South, the beginning of which has been fairly made 60 years and more after the report of Professor Tuomey appeared. Dormant for nearly thirty years, while mineral resources in the rest of the country were being worked, and increasing in value every year in a certain proportion to the advance toward depletion elsewhere, the minerals of the South, many of them still of unknown quantity, have in the past 32 years been features of the history of the material growth of the country.

The remarkable advance made by the mineral industries of the South is shown in the fact that in 1910 the value of the mineral output in the South, \$369,678,060, was \$4,749,762 greater than the value of the mineral output of the whole country in 1880, when it amounted to \$364,928,298. The increase in this value between 1880 and 1910 was \$351,452,452, or nearly twenty times the value, \$18,225,508, of the output in 1880, while the output in the rest of the country had increased in value less than five times.

The greatest rate of increase in any of the three decades was a little more than 229 per cent., from \$18,225,508 to \$60,217,825, or by \$41,992,317, between 1880 and 1890, the special impetus given to Southern mineral development within that period being emphasized by the fact that the rate of increase in the rest of the country was a little more than 157 per cent.

In 1910, seven Southern States had each a mineral output of a greater value than the total value of the South in 1880, and every State had had in the thirty years an enormous increase, Alabama from \$779,242 to \$47,751,109, or \$46,971,867; Arkansas from \$65,535 to \$5,350,705, or \$5,285,170; Florida from \$1500 to \$9,284,705, or \$9,283,205; Georgia from \$703,078 to \$6,048,253, or \$5,345,175; Kentucky from \$1,583,295 to \$21,512,982, or \$19,929,687; Louisiana from \$48,000 to \$10,119,993, or \$10,071,993; Maryland from \$3,731,280 to \$15,440,207, or \$11,708,927; Mississippi from \$40,000 to \$840,152, or \$800,152; Missouri from \$4,736,280 to \$52,640,054, or \$47,903,774; North Carolina from \$575,679 to \$2,616,131, or \$2,040,452; Oklahoma from \$170,000 to \$32,988,865, or \$32,818,865; South Carolina from \$794,086 to \$2,021,371, or \$1,227,285; Tennessee from \$1,115,155 to \$21,396,784, or \$20,281,629; Texas from \$134,640 to \$18,383,451, or \$18,248,811; Virginia from \$1,263,039 to \$18,224,987, or \$16,961,948, and West Virginia from \$2,484,699 to \$105,058,311, or \$102,573,612—a total increase of \$351,452,552.

VALUE OF THE SOUTH'S MINERAL OUTPUT.

	1880.	1890.	1900.	1910.
Alabama	\$779,242	\$6,906,439	\$13,701,505	\$47,751,109
Arkansas	65,535	1,130,226	2,383,500	5,350,705
Florida	1,500	464,706	3,326,517	9,284,705
Georgia	703,078	2,817,706	3,448,233	6,048,253
Kentucky	1,583,295	4,315,997	7,102,364	21,512,982
Louisiana	48,000	423,125	789,219	10,119,993
Maryland	3,731,280	6,200,000	11,942,000	15,440,207
Mississippi	40,000	300,959	621,985	840,152
Missouri	4,736,280	13,794,930	13,407,664	52,640,054
North Carolina	575,679	836,769	1,458,848	2,616,131
Oklahoma	170,000	785,000	2,562,540	32,988,865
South Carolina	794,086	3,303,854	2,451,086	2,021,371
Tennessee	1,115,155	4,871,083	8,651,904	21,396,784
Texas	134,640	2,359,634	5,295,753	18,383,451
Virginia	1,263,039	3,274,178	5,658,801	18,224,987
West Virginia	2,484,699	8,433,219	47,055,384	105,058,311
Total	\$18,225,508	\$60,217,825	\$129,857,303	\$369,678,060
United States	\$364,928,298	\$606,476,380	\$1,107,031,392	\$2,003,744,869

Arkansas—Bauxite, clays, coal, fuller's earth, glass sand, iron ore, lead, lime, manganiferous ores, mineral waters, natural gas, oilstones, phosphate rock, precious stones, sand and gravel, slate, stone and zinc.

Florida—Clays, fuller's earth, lime, mineral waters, phosphate rock, sand and gravel, stone, sulphur.

Georgia—Asbestos, barytes, bauxite, cement, clays, coal, copper, fuller's earth, glass sand, gold, graphite, iron ore, lead, mica, mineral waters, ochre, precious stones, pyrite, sand and gravel, silver, stone, talc, soapstone and tungsten.

Kentucky—Asphalt, barytes, cement, clays, coal, fluorspar, glass sand, infusorial earth, iron ore, lead, lime, mineral waters, natural gas, ochre, petroleum, sand and gravel, stone and zinc.

Louisiana—Clays, mineral waters, natural gas, petroleum, salt, sulphur, sand and gravel.

Maryland—Cement, clays, coal, copper, feldspar, glass sand, infusorial earth, iron ore, lime, mineral waters, quartz, sand and gravel, slate, stone, talc and soapstone.

Mississippi—Clays, mineral waters, sand and gravel.

Missouri—Barytes, cement, clays, coal, cobalt oxide, copper, glass sand, gold, infusorial earth, lead, lime, mineral waters, natural gas, nickel, petroleum, sand and gravel, silver, stone, zinc.

North Carolina—Barytes, clays, coal, copper, garnet, gold, iron ore, lime, mica, millstones, mineral waters, monazite, precious stones, quartz, sand and gravel, silver, stone, talc and soapstone, tin and zircon.

Oklahoma—Asphalt, bromine, cement, clays, coal, gypsum, lead, lime, mineral waters, natural gas, petroleum, salt, sand and gravel, stone and zinc.

South Carolina—Clays, fuller's earth, glass sand, gold, lime, manganese ores, mica, mineral waters, monazite, phosphate rock, quartz, sand and gravel, silver, stone and tin.

Tennessee—Barytes, bauxite, clays, coal, copper, gold, iron ore, lead, lime, manganese ores, mineral waters, natural gas, petroleum, phosphate rock, sand and gravel, silver, stone and zinc.

Texas—Asphalt, cement, clays, coal, fuller's earth, gold, gypsum, iron ore, lead, lime, mineral waters, natural gas, petroleum, precious stones, quicksilver, salt, sand and gravel, silver, stone and zinc.

Virginia—Asbestos, barytes, cement, clays, coal, copper, feldspar, glass sand, gold, gypsum, iron ore, lead, lime, manganese ores, mica, millstones, mineral waters, ochre, precious stones, pyrite, rutile, sand and gravel, silver, slate, stone, talc and soapstone and zinc.

West Virginia—Bromine, cement, coal, glass sand, grindstones, iron ore, lime, mineral waters, natural gas, petroleum, salt, sand and gravel and stone.

The distribution of leading minerals by States is indicated as follows:

Asbestos—Georgia and Virginia.

Asphalt—Kentucky, Oklahoma and Texas.

Barytes—Georgia, Kentucky, Missouri, North Carolina, Tennessee and Virginia.

Bauxite—Alabama, Arkansas, Georgia and Tennessee.

Bromine—Oklahoma.

Cement—Georgia, Kentucky, Maryland, Missouri, Oklahoma, Texas, Virginia and West Virginia.

Clays—Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

Coal—Alabama, Arkansas, Georgia, Kentucky, Maryland, Missouri, North Carolina, Oklahoma, Tennessee, Texas, Virginia and West Virginia.

Cobalt Oxide—Missouri.
 Copper—Alabama, Georgia, Maryland, Missouri, North Carolina, Tennessee and Virginia.
 Feldspar—Maryland and Virginia.
 Fluorspar—Kentucky.
 Fuller's Earth—Arkansas, Florida, Georgia, South Carolina and Texas.
 Garnet—North Carolina.
 Glass Sand—Arkansas, Georgia, Kentucky, Maryland, Missouri, South Carolina, Virginia and West Virginia.
 Gold—Alabama, Georgia, Missouri, North Carolina, South Carolina, Tennessee, Texas and Virginia.
 Graphite—Alabama and Georgia.
 Grindstones—West Virginia.
 Gypsum—Oklahoma, Texas and Virginia.
 Infusorial Earth—Kentucky, Maryland and Missouri.
 Iron Ore—Alabama, Arkansas, Georgia, Kentucky, Maryland, North Carolina, Tennessee, Texas, Virginia and West Virginia.
 Lead—Arkansas, Georgia, Kentucky, Missouri, Oklahoma, Tennessee, Texas and Virginia.
 Lime—Alabama, Arkansas, Florida, Georgia, Kentucky, Maryland, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.
 Manganese Ores—South Carolina, Tennessee and Virginia.
 Manganiferous Ores—Arkansas.
 Mica—Alabama, Georgia, North Carolina, South Carolina and Virginia.
 Millstones—North Carolina and Virginia.
 Mineral Waters—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.
 Monazite—North Carolina and South Carolina.
 Natural Gas—Alabama, Arkansas, Kentucky, Louisiana, Missouri, Oklahoma, Tennessee, Texas and West Virginia.

SOUTHERN COAL PRODUCTION.

States.	Workable Coal Fields, Square Miles.	Production, Tons of 2,000 Pounds.			
		1880.	1890.	1900.	1910.
Ala.....	8,430	323,972	4,090,409	8,394,275	16,111,462
Ark.....	1,684	14,778	399,888	1,447,945	1,905,958
Ga.....	167	154,644	228,337	315,557	177,245
Ky.....	16,670	946,288	2,701,496	5,328,964	14,623,319
Md.....	455	2,228,917	3,357,813	4,024,688	5,217,125
Mo.....	16,700	844,304	2,735,221	3,540,103	2,982,433
N. C.....	60	350	10,262	17,734	.....
Okla.....	10,000	120,947	869,229	1,922,298	2,646,226
Tenn.....	4,400	495,131	2,169,585	3,509,562	7,121,380
Texas.....	10,200	.....	184,440	968,373	1,892,176
Va.....	1,900	43,079	784,011	2,393,754	6,507,997
W. Va....	17,000	1,829,844	7,394,654	22,647,207	61,671,019
Total...	87,666	7,002,254	24,925,345	54,510,460	120,856,340
U. S.....	327,596	71,481,570	157,770,963	269,684,027	501,576,895

SOUTH'S COAL PRODUCTION IN 32 YEARS.

(Tons of 2,000 Pounds.)

Years.	The South.	United States.
1880.....	7,002,254	71,481,570
1881.....	9,053,648	85,881,030
1882.....	9,578,845	103,551,189
1883.....	12,357,308	115,707,525
1884.....	15,027,117	120,155,551
1885.....	16,232,856	111,160,295
1886.....	15,055,594	113,680,427
1887.....	19,182,533	130,650,511
1888.....	22,707,641	148,659,657
1889.....	21,880,419	141,229,513
1890.....	24,925,345	157,770,963
1891.....	28,538,303	168,566,669
1892.....	29,410,706	179,329,071
1893.....	30,707,591	182,352,774
1894.....	30,566,647	170,741,526
1895.....	33,211,816	193,117,530
1896.....	35,184,172	191,986,357
1897.....	38,317,991	200,229,199
1898.....	42,854,926	219,976,267
1899.....	48,248,146	253,741,192
1900.....	54,510,460	269,684,027
1901.....	59,612,513	293,299,816
1902.....	64,523,697	301,590,439
1903.....	72,971,238	357,356,416
1904.....	75,062,460	351,816,398
1905.....	83,637,382	392,722,635
1906.....	92,129,023	414,157,278
1907.....	102,470,429	480,363,424
1908.....	89,088,282	415,842,698
1909.....	102,672,857	460,803,416
1910.....	120,856,340	501,576,895
1911*.....	115,000,000	495,000,000
Total.....	1,512,578,539	7,794,182,258

*Estimated.

SOUTHERN PETROLEUM OUTPUT—BARRELS.

States.	1880.	1890.	1900.	1910.
West Virginia.....	179,000	492,578	16,195,675	11,751,871
Kentucky.....	.....	6,000	62,259	468,774
Tennessee.....	.....	.....	54	836,039
Texas.....	.....	278	1,602	3,615
Missouri.....	.....	.....	6,472	52,028,718
Oklahoma.....	.....	.....	.....	6,841,395
Louisiana.....	.....	.....	.....	.....
Total.....	179,000	498,910	17,102,047	79,993,639
United States.....	26,286,123	45,823,572	63,620,529	209,556,048

PETROLEUM PRODUCTION—BARRELS.

Years.	The South.	United States.
1880.....	179,000	26,286,123
1881.....	151,000	27,661,238
1882.....	128,000	30,349,897
1883.....	130,755	23,449,633
1884.....	94,148	24,218,438
1885.....	96,164	21,858,785
1886.....	106,726	28,064,841
1887.....	149,791	28,283,483
1888.....	124,544	27,612,025
1889.....	549,581	35,163,513
1890.....	498,910	45,823,572
1891.....	2,415,327	54,292,655
1892.....	3,816,721	50,514,657
1893.....	8,448,522	48,431,066
1894.....	8,579,322	49,344,516
1895.....	8,121,722	52,892,276
1896.....	10,023,113	60,960,361
1897.....	13,156,986	60,475,516
1898.....	14,166,749	55,364,233
1899.....	14,598,064	57,070,850
1900.....	17,102,047	63,620,529
1901.....	18,720,378	69,389,194
1902.....	32,368,808	88,766,916
1903.....	32,458,935	100,461,337
1904.....	40,212,661	117,080,960
1905.....	57,845,152	134,717,580
1906.....	50,983,408	126,493,936
1907.....	70,767,185	166,095,335
1908.....	73,060,292	178,527,355
1909.....	71,843,074	183,170,874
1910.....	79,993,639	209,556,048
1911*.....	85,000,000	217,000,000
Total.....	715,890,724	2,462,997,742

*Estimated.

Nickel—Missouri.
 Ochre—Georgia, Kentucky and Virginia.
 Oilstones—Arkansas.
 Petroleum—Kentucky, Louisiana, Missouri, Oklahoma, Tennessee, Texas and West Virginia.
 Phosphate Rock—Arkansas, Florida, South Carolina and Tennessee.
 Precious Stones—Arkansas, Georgia, North Carolina, Texas and Virginia.
 Pyrite—Alabama, Georgia and Virginia.
 Quartz—Maryland, North Carolina and South Carolina.
 Quicksilver—Texas.
 Rutile—Virginia.
 Salt—Louisiana, Oklahoma, Texas and West Virginia.
 Sand and Gravel—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.
 Silver—Alabama, Georgia, Missouri, North Carolina, South Carolina, Tennessee, Texas and Virginia.
 Slate—Arkansas, Maryland and Virginia.
 Stone—Alabama, Arkansas, Florida, Georgia, Kentucky, Maryland, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.
 Sulphur—Florida and Louisiana.
 Talc and Soapstone—Georgia, Maryland, North Carolina and Virginia.
 Tin—North Carolina and South Carolina.
 Tungsten—Georgia.
 Zinc—Arkansas, Kentucky, Missouri, North Carolina, Oklahoma, Tennessee, Texas and Virginia.
 Zircon—North Carolina.

This list of commercially produced minerals does not include alum in Alabama, antimony in Arkansas and Texas, asbestos in Alabama and South Carolina, asphalt in Alabama, barytes in South Carolina, bauxite in Texas, cement rock in Florida, Mississippi and Alabama, copper in South Carolina and Texas, corundum in Alabama, Georgia, North Carolina and South Carolina, feldspar in South Carolina, glass sand in Texas, graphite in South Carolina, gypsum in Arkansas and Louisiana, infusorial earth in Florida, iron ores in South Carolina, lead ore in Alabama, lignites in Alabama, Arkansas, Louisiana, Mississippi, Tennessee and Texas, manganese ores in Georgia and Texas, marls in the Carolinas, Florida, Georgia, Maryland, Mississippi, Texas and other States, nickel and cobalt in South Carolina, nitre in Alabama, ochres in Arkansas, peat in

Florida, petroleum in Alabama, phosphates in Alabama, Georgia, Mississippi and North Carolina, pyrite in Arkansas, soapstone in Alabama and South Carolina, silver in Arkansas, slate in Tennessee, talc in Texas and tin in Virginia. More than 180 different minerals have been noted in North Carolina and more than 111 in Texas.

The exploitation of the mineral riches of the South, delayed as it was by the impediments in the way of its full participation in the activities of the manufacturing age, was at first rather slow and limited to half a dozen products in the main.

The South was using its iron ores early in Colonial days, and the first bituminous coal mined in this country was from a field about thirteen miles above Richmond, Va. Its presence there was recognized in the year 1700, but mining of it was not begun until the last quarter of the eighteenth century. The commercial production of coal began in Maryland in 1820 with an output of 3000 tons; in Kentucky in 1828 with an output of 328 tons; in Missouri in 1840 with 9972 tons; in Alabama with 946 tons; in Tennessee with 558 tons; in Arkansas with 220 tons, and in North Carolina with 3 tons, all in the same year; in Georgia in 1860 with 1900 tons; in Oklahoma, then the Indian Territory in 1880, with 120,947 tons, and in Texas in 1884 with 125,000, the production in West Virginia having continued after that portion of Virginia was made a separate State. But in the ninety-odd years before 1880 in which coal was produced in the South, the total output in that section was less than 100,000,000 tons. Since then the South has mined 1,522,000,000 tons of coal, or nearly 20 per cent. of the total amount of coal mined in the United States in that period. It has been constantly increasing in importance as a factor in the industrial life of the country as shown in its greater proportionate output in 1911 than in 1880. In the earlier year the whole country produced only 71,481,570 tons, but in 1910 the combined outputs of Alabama and West Virginia alone were 6,300,911 tons greater, and the South's output of 120,856,340 tons was 49,374,770 tons greater than the 1880 output of anthracite and bituminous of the country combined, and nearly three times as much as the total output, 42,831,758 tons, of bituminous coal in the United States in 1880.

Between 1880 and 1910 the production increased in the South from 7,002,254 tons to 120,856,340 tons, or by 113,854,086 tons, equal to 1625.9 per cent., and in the rest of the country from 64,479,316 tons to 380,720,555 tons, or by 316,241,239 tons, equal to 490.4 per cent.

SOUTHERN IRON ORE PRODUCTION.

States.	(Tons of 2240 Pounds.)			
	1880.	1890.	1900.	1910.
Alabama.....	68,919	1,897,815	2,759,247	4,801,275
Georgia.....	24,394	244,088	336,186	313,878
Kentucky.....	51,525	77,685	52,920	64,347
Maryland.....	54,855	35,657	26,223	14,062
Missouri.....	344,819	181,690	41,366	78,341
North Carolina.....	2,963	22,873	*	65,278
Tennessee.....	63,279	465,695	594,171	732,247
Texas.....	2,232	22,000	16,881	29,535
Virginia.....	26,727	543,583	921,821	903,377
West Virginia.....	62,802	25,116	†	§
Total.....	702,515	3,516,202	4,748,815	7,002,340
United States.....	7,100,000	16,036,043	27,553,161	56,889,734

*Included with Georgia. †Included with Virginia. §Included with Kentucky.

IRON ORE PRODUCTION.

Years.	(Tons of 2240 Pounds.)	
	The South.	United States.
1880.....	702,515	7,100,000
1881.....	*793,011	*8,000,000
1882.....	*905,424	*8,800,000
1883.....	*886,339	*8,000,000
1884.....	820,367	*7,800,000
1885.....	805,621	7,600,000
1886.....	1,161,183	10,000,000
1887.....	*2,488,785	11,000,000
1888.....	*2,669,931	12,000,000
1889.....	3,198,598	14,518,041
1890.....	3,516,202	16,036,043
1891.....	3,726,251	14,591,178
1892.....	3,908,200	16,296,666
1893.....	3,072,413	11,587,629
1894.....	2,708,923	11,879,679
1895.....	3,767,398	15,957,614
1896.....	3,662,984	16,005,449
1897.....	3,657,037	17,518,046
1898.....	3,946,677	19,433,716
1899.....	4,642,090	24,683,173
1900.....	4,748,815	27,553,161
1901.....	4,830,667	28,887,479
1902.....	5,970,061	35,554,135
1903.....	5,997,106	35,019,308
1904.....	5,237,195	27,644,330
1905.....	5,700,759	42,526,133
1906.....	6,325,710	47,749,728
1907.....	6,527,027	51,720,619
1908.....	5,639,201	35,983,336
1909.....	6,294,145	51,294,271
1910.....	7,002,340	56,889,734
1911*.....	6,000,000	44,000,000
Total.....	121,312,975	743,629,468

*Partly estimated.

SOUTHERN PHOSPHATE OUTPUT—LONG TONS.

Years.	South Carolina.	Florida.	Tennessee.	United States.
1880.....	190,763	.....	.....	211,377
1881.....	266,734	.....	.....	266,734
1882.....	332,077	.....	.....	332,077
1883.....	378,380	.....	.....	378,380
1884.....	431,779	.....	.....	431,779
1885.....	437,856	.....	.....	437,856
1886.....	430,549	.....	.....	430,549
1887.....	480,558	.....	.....	480,558
1888.....	448,567	3,000	.....	451,557
1889.....	541,645	4,100	.....	550,245
1890.....	463,998	46,501	.....	510,499
1891.....	475,506	112,482	.....	587,988
1892.....	394,228	287,343	.....	681,571
1893.....	502,564	438,804	.....	941,368
1894.....	450,108	527,653	19,188	996,949
1895.....	431,975	568,061	38,515	1,038,551
1896.....	402,423	495,199	26,157	930,779
1897.....	358,280	552,342	128,723	1,039,345
1898.....	399,884	600,894	308,107	1,308,885
1899.....	356,650	726,420	424,109	1,515,702
1900.....	329,173	706,243	454,491	1,491,216
1901.....	321,181	751,996	409,653	1,483,723
1902.....	313,365	785,430	390,799	1,490,314
1903.....	258,540	860,336	460,530	1,581,576
1904.....	270,806	1,072,951	530,571	1,874,428
1905.....	270,225	1,194,106	482,859	1,947,190
1906.....	223,675	1,304,505	547,677	2,080,957
1907.....	257,221	1,357,365	638,612	2,265,343
1908.....	225,495	1,692,102	455,431	2,386,138
1909.....	207,954	1,779,702	333,003	2,330,152
1910.....	179,659	2,067,507	398,188	2,654,988
Total.....	11,031,818	17,935,042	6,046,613	35,108,774

In 1910 West Virginia ranked second among the States of the country in coal production, Alabama sixth, Kentucky seventh, Tennessee eleventh, Virginia twelfth, Maryland thirteenth, Missouri seventeenth, Oklahoma nineteenth, Arkansas twenty-first, Texas twenty-second and Georgia twenty-fifth. The production in West Virginia increased between 1880 and 1910 from 1,829,844 tons to 16,671,019 tons; in Alabama, which ranks second in the South, from 323,972 tons to 16,111,462 tons; in Kentucky, which ranks third, from 946,288 tons to 14,623,319 tons; in Tennessee, which ranks fourth, from 495,131 tons to 7,121,380 tons, and in Virginia, which ranks fifth, from 43,079 tons to 6,507,997 tons.

It is estimated that, with the wastes included, about 2,300,000,000 tons of coal have been taken from the coal fields of the South, but that amount is small in comparison with the original supply in the more than 87,000 square miles of workable coal fields and in 99,000 square miles of coal fields, if coal under very heavy cover be included. The present available supply is about 530,000,000,000 tons, and of that supply 278,000,000,000 tons are in West Virginia, Kentucky and Tennessee. And into that portion of the highland South, where these three States and Virginia converge, money has been pouring by the millions of dollars in the last few years as investments in coal lands and coking plants, while the energies of great railroad corporations have been directed upon the task of building into the region from which there will be a steadily expanding volume of traffic for many years to come.

Striking as has been the advance in coal production, it has been surpassed by that of petroleum, and the latter has been marked by a number of really dramatic incidents. From an output of 120,000 barrels in West Virginia in 1876, the production in the South has developed to 85,000,000 barrels annually in seven States. When West Virginia entered the field the country was producing 9,132,669 barrels of petroleum, and in 1880, by which time West Virginia's output had become 179,000 barrels, the country's output had more than doubled. Between 1880 and 1911 the South's output increased by 84,821,000 barrels, almost a creation from nothing, and the output of the rest of the country increased from 26,107,123 barrels to 132,000,000 barrels, or by 115,892,877 barrels, equal to 443.8 per cent. In 1880 the output of Pennsylvania and New York, where production then centered, was 26,027,630 of the total 26,286,123 barrels produced in the country. In 1910 the production in these two States amounted to only 9,848,500 barrels, or a little more than 4 per cent. of the total, and the production in West Virginia was nearly 2,000,000 barrels more than that of the original field. Knowledge of the presence of petroleum has long been had by the South. It was recognized in Texas a few years before the war, and a well in Cumberland County, Kentucky, which was struck in 1829, and is said to be the first one in the country, flowed for thirty-one years continuously, while others drilled in the same vicinity after the great discovery of 1859 in Pennsylvania yielded considerable oil for a time, and then ceased to produce. More than twenty years elapsed before Kentucky petroleum, together with some from Tennessee, became again a commercial proposition, and those two States and West Virginia were the only producers in the South until 1889, when small quantities of oil were produced in Texas and Missouri. The largest annual output in the latter State has been 15,246 barrels, in 1908. But in Texas, where production was confined principally to the Corsicana field, which yielded 836,039 barrels in 1890, there was a sudden expansion to 4,393,658 barrels in 1901 as a consequence of the outbreak of the gushers near Beaumont. The first of these, an experimental well, developed in January of that year a flow of oil four times greater than that of any other well in the United States up to that time. At the start it blew out volumes of sand and gravel and hundreds of feet of four-inch tubing, and for nine days threw petroleum through a six-inch tubing one hundred feet

above the top of the derrick and then settled down to a flow of 75,000 barrels a day. This spectacular announcement of the presence of an oil pool in that region brought a rush of prospectors and investors and set others to investigating in Louisiana, with the result that in 1902, when Texas produced 18,083,658 barrels, Louisiana came into the field with an output of 548,617 barrels. Since then Texas has had a yearly output as high as 28,136,189 barrels in 1905, and Louisiana one of 9,077,528 barrels in the next year, and the importance of the Southwest in this particular has resulted in the laying of hundreds of miles of pipe lines leading the oil to tidewater for shipment abroad and to the building of refineries, notably one at Baton Rouge, La., to use not only the oil of that State, but, by means of a pipe line, oil from the mid-continent field in which Oklahoma dominates.

Even before the discoveries in the Southwest the decline in the older Appalachian field had been noted, and just about the time when the Gulf field began to show signs of gradually lessening production, Oklahoma gave a dramatic display in its Glenn pool in the Creek Nation, which was discovered by a test in 1905, and which sent production of the State in the following year up to 43,524,128 barrels, which was nearly equal the production of the whole country in 1890. There has been a steady advance in that field since then, and its output in 1911 of 55,000,000 barrels was exceeded by that of only one State, California, and was more than a quarter of the total production of the country.

In connection with petroleum there has developed the use of an enormous amount of natural gas, shown by an advance in annual value from \$215,000 in 1882 to \$65,000,000 or more in 1911 in the whole country. In production of this fuel, West Virginia ranks next to Pennsylvania, the leading State, and its output, much of which is piped to other States, amounts to more than 60,000,000,000 cubic feet annually, while Oklahoma produces to the extent of more than 20,000,000,000 cubic feet, and Louisiana is also a large producer.

Early in the fifties Abram S. Hewitt of New York was impressed by the riches in iron ore of the Birmingham district, in Alabama, and secured options on a large amount of iron ore land. But his plans were disarranged by the war. Those riches, however, were not forgotten and they attracted in the sixties and seventies the attention of experts, even in England, where the advantages of contiguity of ore, coal and fluxing material were recognized. However, the year 1880 found the South as a whole using but 702,515 tons of iron ore, which was something less than a tenth of the amount produced in the United States. Since then the South has produced 121,312,975 tons, or 16.3 per cent. of the total production of the country, and its proportion of the total output has risen to 13.7 per cent. The greater portion of the known iron ore resources of the South are in its Appalachian region, though there are deposits in tidewater Maryland, in Western Kentucky and Tennessee, in Eastern Missouri and Eastern Texas, and in the South there are more than 110 furnaces using the ore.

The immense possibilities in the Southern ore resources have been emphasized by recent expansion of development into new fields, and more recently by the facts set forth in the summer of last year by mineralogical experts. At that time Edwin C. Eckel recalled a preliminary estimate on the iron ore reserves of certain Southern States that he had made five years before when connected with the United States Geological Survey. This estimate, dealing with the minimum workable iron ore reserves above the thousand-foot level in Alabama, Georgia, Tennessee and Virginia, was 1,850,000,000 tons of red ore and 725,000,000 tons of brown ore, and, allowing for the ores occurring at deeper levels in these four States, for the red and brown ores of Maryland, West Virginia and Kentucky and for the magnetic ores of other Southern States, at least 10,000,000,000 tons. Mr. Eckel said that he regarded that estimate as reasonably correct and called attention to the fact that a later estimate in 1909 by the Government placed the amount of workable and salable ores and those not immediately available at nearly 3,000,000,000 tons, which estimate he regarded as very conservative. Director William B. Phillips of the bureau of economic geology and technology of the University of Texas called attention to the ores rich in iron underlying 17,000 square miles in his State, and State Geologist Joseph Hyde Pratt of North Carolina estimated that in that State above the hundred-foot level are 16,000,000 tons of iron ore. It was shown, too, that within fifty miles of Chattanooga, Tenn., are ore companies with deposits estimated by the engineers as aggregating 570,000,000 tons. An operator in Eastern Texas said that the holdings of his company were between 125,000,000 and 150,000,000 tons, with the rest of the State having twice as much more. Two companies in Roane County, Tenn., estimated their supply at 100,000,000 tons, about one-fifth of the total ore in the county. State Geologist I. C. White of West Virginia accounted for 300,000,000 tons in nine counties of his State. State Geologist S. W. McCallie of Georgia referred to data in his office, showing approximately 300,000,000 tons in that State, and Charles Catlett of Staunton, Va., spoke of the very large quantities of silicious gray ores of Eastern Alabama. So it is obvious that for many years to come Southern iron ores are to be a large dependence for the iron and steel industry of the country.

The known phosphate deposits of the United States are along the west coast of Florida, the coast of South Carolina, in central Tennessee, in parts of Arkansas, Georgia, North Carolina, Alabama and Mississippi, and in South-eastern Idaho, Southwestern Wyoming, Northeastern Utah and Nevada. Since phosphate rock began to be commercially developed in South Carolina in 1867, though efforts had been made in that direction six years before, the South has supplied practically all of this mineral produced in the United States. Until 1888 the market was controlled by South Carolina companies that had increased their production between 1880 and 1887 from 190,763 tons to 480,558 tons. But in 1887 phosphates were discovered in Florida. In the next year that State made shipments of pebble phosphate to Atlanta. In 1889 the hard rock was uncovered, and since then the Florida industry has made a

steady and rapid advance from an annual output of 46,501 tons in 1889 to one of more than 2,000,000 tons in 1910. In 1889 South Carolina had its greatest annual output, 541,645 tons, but it yielded first place to Florida in 1894. In that year, when Florida produced 527,653 tons, Tennessee, where the presence of the mineral had been known for seven years, entered the market with 19,188 tons, and since then has mined more than 6,000,000 tons. Phosphate was discovered in Arkansas in 1895, and five years later a mining and milling plant began operation. But this was soon burned, and only within the past three or four years has production been resumed in any degree.

No one can accurately measure the extent of the phosphate deposits of all grades in the South. The supply is apparently becoming exhausted in South Carolina, recent exploration in Tennessee points to an expansion of the known area of deposits in that State, while developments in Florida warrant belief that full knowledge of the resources in that State has not yet been gained.

In sulphur the South through its Louisiana deposits dominates the markets of the world for that product. From 1868 to 1894 little was done in developing the Louisiana field because of the difficulties of sinking shafts through water-bearing sand overlying the sulphur bed. But in the latter year Herman Frasch of Cincinnati devised a process of liquefying the sulphur underground and pumping it from a depth of a thousand feet or more to the surface, where, 99½ per cent. pure, it is solidified. After years of costly experimentation the company controlling the beds was in a position to revolutionize the sulphur business of the world, even in the face of a practical Italian Government monopoly in the operation of the Sicilian sulphur mines. That had to be. In Sicily the workmen mined by hand in hot pits and chambers filled with stifling fumes and carrying 40-pound loads of sulphur in baskets on their backs up 180 feet of steps or ladders. In Louisiana the human work is all above ground, the Frasch process bringing the mineral to the surface. Prior to 1902 so little sulphur was mined that the census combined the figures of sulphur and pyrite production. In that year the exports of sulphur from Sicily to this country were 171,380 tons, valued at \$3,357,650, but by 1909 this importation had fallen to 30,589 tons, valued at \$549,632. The big decline in any one year since 1902 was in 1905, when the 84,339 tons imported were 45,193 tons less than in 1904, and in 1908 these importations reached the low level of 21,136 tons. In the meantime, because of the operations in the Louisiana field, production of sulphur in this country rose to 127,292 tons, valued at \$2,663,760, in 1904, and to 239,312 tons, valued at \$4,432,066, in 1909, the record year having been 1908, when 369,444 tons, valued at \$6,668,215, were produced. The exports of sulphur from this country were 6553 tons greater than the imports to the country in 1909. The promise of greater production of this mineral, so essential in many arts and industries, is given in the organization announced since the opening of this year of a company to develop 10,000 acres of land underlaid with sulphur near Stamford, Tex.

Louisiana has developed, too, a great salt industry, and ranks among the leading producers of the country, the rock salt being, in the main, so pure that after mining little is required beside crushing, screening, grinding and winnowing. The brines of West Virginia and the salines of Texas yield together something more than 75,000 tons of salt annually. Oklahoma has begun to produce, and the salt of Virginia is marketed in the shape of derived chemicals.

The last mentioned policy is that which adopted more generally will be to the advantage of the South. Too large quantities of minerals playing an important part in the commercial chemical industry are now handled outside the South, whereas their use in manufacturing and in the agricultural and industrial arts, as fully as possible near the sources of mining, would give the South the full benefit of production and application.

As a great reserve source of fuel are the lignites, occupying 6000 square miles in Alabama, 6000 in Arkansas, 8800 in Louisiana, 7500 in Mississippi, 1000 in Tennessee and 55,000 in Texas, a total of 84,300 square miles. Quite satisfactory results have already been obtained from these lignites in the manufacture of producer gas.

Another reserve fuel is peat. This substance in course of evolution from vegetable to mineral has many uses as a fertilizer, as an absorbent and disinfectant, as litter and bedding for stock, as insulating and packing material, but the location of its deposits in the country clearly indicates its availability for fuel, as the narrow strip of territory in which peat beds are found, extending along the Atlantic Coast to Florida, including the whole of that State and reaching westward toward Texas, is the territory in which coal does not lie. Experiments of 35 or 40 years ago in the conversion of peat into fuel had small practical results, but in the past seven or eight years they have been renewed, and have demonstrated that a commercially valuable type of peat fuel in the form of air-dried slightly compressed blocks can be produced at a cost of from 75 cents to \$1.25, or \$1.50 a ton, and may be used in lime burning, in brick-kilns and as a source of producer gas.

The supply of various kinds of clays in the South is inexhaustible, and, though comparatively slight inroads have been made upon them in industry, they have been developed sufficiently to indicate their usefulness. Between 1900 and 1910 the value of clay products increased from \$17,857,859 to \$30,906,654, or by \$13,048,795, equal to 73 per cent. in the South, and in the rest of the country from \$78,354,486 to \$139,209,320, or by \$60,854,834, equal to about the same per cent. Of the total value, \$27,329,213 represented brick and tile, in the making of which Missouri leads the South with a value of \$7,058,705, Texas being second with \$2,744,845, Georgia third with \$2,510,740, Kentucky fourth with \$2,418,116, and Virginia fifth with \$1,793,270. The value of pottery made in 15 of the Southern States in 1910 was \$3,577,541, of which \$2,675,588 was the value of West Virginia pottery. This suggests the advance made by that State from sixth place among the States of the Union in the value of pottery products in 1900 to third place in 1910, passing Illinois, Indiana and Penn-

sylvania, and the value of its pottery products more than quadrupling as a consequence of the expanding use of natural gas in the industry.

In a number of States are valuable kaolins and deposits of fuller's earth, and one of the largest developments of water-power for the generation of electric energy planned in the South has as its purpose the derivation of aluminum from bauxite.

Missouri is the dominating center of lead and zinc production in this country, though developments on a large scale have been under way in Arkansas for a dozen years or more, and within the past three years Oklahoma has begun production. Zinc and lead mines are also worked in Texas, and that State produces quicksilver. In 1910 Missouri produced 140,652 tons of primary zinc spelter, 57 per cent. of the total production of the country; Oklahoma 2297 tons, Virginia 1168 tons, Tennessee 925 tons, Arkansas 286 tons, and Kentucky 29 tons. Missouri produces more than 40 per cent. of the metallic lead of the country.

Tennessee is the leading copper producer of the South, its output in 1910

having been 16,691,777 pounds in the total Southern production of 17,585,608 pounds. Missouri produced 603,570 pounds, North Carolina 181,263 pounds, Virginia 105,313 pounds, Texas 2961 pounds, and Georgia 724 pounds.

Where once it was a case of the South sending to other parts of the country for its building stone, in spite of vast marble and granite beds in many States, now the products of Southern marble quarries and granite quarries are in demand in the leading cities of the country for use both in the walls of public buildings and private residences and in interior decorations.

In addition to natural cement rock, the South has an abundance of the materials for the manufacture of Portland cement, already being utilized by a number of establishments with modern equipment and methods. Of 110 such plants in operation in the country in 1910, fifteen were in the South, but of the eight which began operations in that year three were in the South.

The list of more than 50 minerals produced commercially in the South, and the general facts here given of the development of the leading ones already made, are tokens of what the South is to do in this domain of activity.

Increasing Demands Upon the South's Lumber Resources

Of the 856,090,000 acres of forest area in the country originally, 400,750,000 were in the South. The last estimate of such resources, that of 1908, showed that the forest area of the country had been reduced to 544,250,000 acres, or by about 36 per cent., and in the South to 258,700,000 acres, or by 35 per cent. Should no more attention be given to reforestation in the next 10 years than has been given in the past 10 years, the depletion of Southern forests will continue at a greater rate than that which has prevailed since Southern lumber has been demanded to take the place of various lumbers that the rest of the country once supplied.

In 1880 the South cut 3,810,038,000 feet board measure, or 21 per cent. of the total cut of the country, which was 18,125,432,000 feet. In 1910 the cut of the South, 21,235,437,000 feet, was more than 53 per cent. of the total cut, 40,018,282,000 feet. In the three decades the South's cut increased 455 per cent. and the increase in the rest of the country was 31 per cent. Though the hardwoods of the South are being called for in greater and greater quantities both by the South and by the rest of the country, it is in the cut of yellow pine that the greatest increase has been made in the South, as shown in the increases of the cuts from 133,472,000 feet to 3,733,900,000 feet in Louisiana, from 168,747,000 feet to 2,122,205,000 feet in Mississippi, from 328,968,000 feet to 1,884,134,000 feet in Texas, from 172,503,000 feet to 1,844,446,000 feet in Arkansas, from 241,822,000 feet to 1,824,722,000 feet in North Carolina, from 315,939,000 feet to 1,652,192,000 feet in Virginia, from 185,772,000 feet to 706,831,000 feet in South Carolina, from 251,851,000 feet to 1,465,623,000 feet in Alabama, from 451,788,000 feet to 1,041,617,000 feet in Georgia, and from 247,627,000 feet to 992,091,000 feet in Florida.

Louisiana ranked second in the production of lumber in the country in 1910, and was one of the 17 States which cut more than 1,000,000,000 feet. Of these 17 States, 10 Southern States—Louisiana, Mississippi, Texas, Arkansas, North Carolina, Virginia, Alabama, West Virginia, Georgia and Tennessee—cut nearly 45 per cent. of the lumber produced in the country. This is largely in consequence of the large yellow pine cut in those States. Of the total cut of lumber in the country 31,160,856,000 feet, or 77.9 per cent., were soft woods, and of these soft woods 14,143,471,000 feet, or 45 per cent., were yellow pine. This wood was cut in 27 States, but Louisiana leads in the production, its output being more than one-fifth of the total, with Mississippi and Texas ranking second and third, respectively. More than 97 per cent. of yellow pine was cut in the Southern States.

More than half of the hardwoods of the country is cut in the South, West Virginia, Kentucky and Tennessee cutting nearly 35 per cent. of the oak and the South as a whole cutting all of the tupelo, about 95 per cent. of the red gum, 89 per cent. of the yellow poplar, 75 per cent. of the hickory, 70 per cent. of the oak, 70 per cent. of the cottonwood, 60 per cent. of the sycamore and 58 per cent. of the chestnut.

The largest cut of lumber of the country, 44,509,761,000 feet, valued at \$684,479,859, was made in 1909, and of that total 24,458,423,000 feet, valued at \$361,568,546, were cut in the South. Of the total cut nearly 24 per cent., or 10,612,802,000 feet, valued at \$207,134,813, was hardwood, and of that cut 6,113,838,000 feet, or 58.6 per cent., valued at \$118,877,766, were cut in the South.

In Tennessee and in the four States, Kentucky, Missouri, Arkansas and Mississippi, abutting upon it, 3,437,914,000 feet of hardwood were cut. That cut

was 56 per cent. of the hardwood cut in the South and Mississippi and 32.4 per cent. of the cut of hardwood in the United States.

Of the five States Tennessee led the country in the cut of oak, 546,500,000 feet, yellow poplar, 164,826,000 feet, and hickory, 58,477,000 feet. Arkansas led the country in the cut of red gum, 200,953,000 feet; cottonwood, 54,507,000 feet, and ash, 33,212,000 feet. In oak Kentucky ranked third in the country, 405,677,000 feet, and Arkansas fifth, 358,556,000 feet. Kentucky ranked third in yellow poplar, 149,808,000 feet, and Mississippi second in red gum, 120,731,000 feet, and third in cottonwood, 46,222,000 feet. Following Tennessee in the cut of hickory, Arkansas ranked second, 45,133,000 feet; Kentucky third, 41,656,000 feet, and Missouri fourth, 33,259,000 feet.

The five States cut 1,750,864,000 feet, or 39.6 per cent. of the total cut of oak in the country; 523,226,000 feet, or 74 per cent. of red gum; 346,742,000 feet, or 40.2 per cent. of the yellow poplar; 200,492,000 feet, or 60 per cent. of the hickory; 132,633,000 feet, or 49.9 per cent. of the cottonwood; 109,302,000 feet, or 16.4 per cent. of the chestnut; 94,581,000 feet, or 32.4 per cent. of the ash; 67,877,000 feet, or 19.5 per cent. of the elm; 56,377,000 feet, or 11 per cent. of the beech; 47,325,000 feet, or 4.2 per cent. of the maple; 26,583,000 feet, or 46.9 per cent. of the sycamore; 23,805,000 feet, or 7 per cent. of the basswood; 20,068,000 feet, or 20.7 per cent. of the tupelo; 13,866,000 feet, or 29.9 per cent. of the walnut, 3,652,000 feet, or eight-tenths of 1 per cent. of the birch; 2,379,000 feet, or 8.9 per cent. of the cherry, and 18,142,000 feet, or 48.3 per cent. of all other woods.

As a matter of fact, the Southern Appalachian region is the great source of hardwood supply in this country, and upon that supply depend such great industries as hardwood lumber manufacturing for divers lines of construction work, furniture-making, cooperage, vehicle manufacture, car building, railroad ties, agricultural implements, transmission poles, etc.

About 150,000 square miles in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Texas and the Carolinas, or about 100,000,000 acres, are still covered by yellow-pine forests, and the cypress of the country is found from Virginia to Texas along the Atlantic and Gulf coasts and in the lowlands of the Mississippi from Southeastern Missouri to the Gulf. Hemlock is in considerable quantities in two or three States, and spruce and white pine are in West Virginia.

Arkansas ranked first in 1909 among the States of the country in the cuts of red gum, cottonwood and ash; Louisiana in yellow pine, cypress and tupelo; Tennessee in oak, yellow poplar and hickory, and West Virginia in chestnut and cherry. North Carolina has almost every kind of forest growth from the subtropical to the north temperate, and of the 51 native woods cut in the country Southern mills handle 39, including yellow pine, white pine, hemlock, spruce, cypress, cedar, balsam fir, oak, maple, yellow poplar, red gum, chestnut, beech, birch, basswood, elm, cottonwood, ash, hickory, tupelo, walnut, sycamore, cherry, buckeye, locust, persimmon, willow, dogwood, apple, magnolia, laurel, sassafras, myrtle and mulberry.

If the calls upon the forest were confined to lumber used in various building operations, there might happen a slackening in the drains following the substitution for wood of reinforced concrete and other materials in construction work. But the forests must furnish, in addition to planks, boards, shingles and laths, many other materials, including poles for telegraph, telephone and other electric operations, for which cedar and chestnut have been preferred,

SOUTH'S LUMBER CUT.

(Feet Board Measure.)

States.	1880.	1890.	1900.	1910.
Ala.....	251,851,000	586,143,000	1,096,539,000	1,465,623,000
Ark.....	172,503,000	526,091,000	1,595,933,000	1,844,446,000
Fla.....	247,627,000	411,436,000	788,905,000	992,091,000
Ga.....	451,788,000	572,970,000	1,308,610,000	1,041,617,000
Ky.....	305,684,000	420,820,000	765,343,000	753,556,000
La.....	133,472,000	303,591,000	1,113,423,000	3,733,900,000
Md.....	123,336,000	82,119,000	183,393,000	154,554,000
Miss.....	168,747,000	452,797,000	1,202,334,000	2,122,205,000
Mo.....	399,744,000	395,755,000	723,754,000	501,691,000
N. C.....	241,822,000	509,436,000	1,278,399,000	1,824,722,000
Okla.....		2,552,000	22,104,000	164,663,000
S. C.....	185,772,000	197,940,000	466,109,000	706,831,000
Tenn.....	302,673,000	450,097,000	939,463,000	1,016,475,000
Texas.....	328,968,000	839,724,000	1,230,904,000	1,884,134,000
Va.....	315,939,000	409,804,000	956,169,000	1,652,192,000
W. Va.....	180,112,000	299,709,000	773,583,000	1,376,737,000
Total....	3,810,038,000	6,460,984,000	14,444,965,000	21,235,437,000
U. S.....	18,125,432,000	23,494,853,000	35,067,595,000	40,018,282,000

and for fence posts and rails, for crossties, for cooperage stock, for mine timbers, for paper manufacture and for tanning.

Ingenuity of man, under the spur partly of necessity as a supply of hardwoods has diminished and partly of the growing realization of the advantages of making the most of every material in industry, has called for more woods in the manufacture of veneers. Confined originally to the use of a few hardwoods of beautiful grain in the manufacture of furniture and in cabinet work, veneer, made now also of softwoods, is turned into cheap packing boxes, berry cups, fruit baskets, drawer bottoms, butter dishes, wooden plates, etc., and the extent of its use is shown in the consumption in 1910 of 477,479,000 feet, log scale, including 158,157,000 feet of red gum, 40,324,000 feet of yellow pine, 39,471,000 feet of maple, 33,812,000 feet of yellow poplar, 33,149,000 feet of cottonwood, 33,005,000 feet of white oak, 27,633,000 feet of birch, 26,548,000 feet of tupelo, 17,272,000 feet of elm, 11,003,000 feet of beech, 9,769,000 feet of red oak, 6,271,000 feet of spruce, 2,724,000 feet of walnut, 2,548,000 feet of sycamore, 2,356,000 feet of ash, 2,006,000 feet of Douglas fir, 1,736,000 feet of chestnut and 2,611,000 feet of all other woods. The marked increase in the consumption of wood in manufacture of veneers from 336,879,000 feet in 1907 to 460,945,000 feet in 1910, or at the rate of about 37 per cent. in the country in four years, was more pronounced in the South, where 85,485,000 feet more were consumed in 1910 than the 177,936,000 feet consumed in 1907, the rate of increase being 48.2 per cent. and every Southern State except Maryland, South Carolina and Tennessee sharing in the increase.

Pulp for paper in increasing quantities is manufactured from spruce, hemlock, poplar, balsam fir, pine, beech, cottonwood and white fir, and until recently most of it has been made in the North and West. But pulp plants are increasing in number in the South, and in 1910 North Carolina, Virginia and West Virginia consumed 115,993 of the 1,473,542 cords of domestic spruce, 67,896 of the 610,478 cords of hemlock, 34,885 of the 315,717 cords of poplar, 20,661 of the 105,882 cords of pine and 47,640 of the 262,637 cords of slabs and other mill waste. There are pulp-making establishments in Maryland, South Carolina and Texas also, and in the last-named State has been successfully demonstrated the availability of pine shavings and other waste in paper-making. Pine and other woods which grow principally in the South will be required for pulp-making in greater and greater quantities; for, while all woods thus consumed increased in quantity between 1907 and 1910 from 3,962,660 cords to 4,094,306 cords, or by 131,646 cords, equal to something less than 3 per cent., the amount of pine thus used increased from 78,583 cords to 105,882 cords, or by 27,299 cords, equal to 36 per cent.

The utilization in the manufacture of paper of the waste of the pine-lumbering operations, and the attention given to the economic possibilities in pine stumps removed from cut-over timber lands as they become farms, have been steps toward using other wastes. For several years investigations have been made as to the value of pine sawdust, and experiments have shown that, at a cost of \$7, from 3200 pounds of green sawdust may be derived 30 gallons of alcohol worth \$12.76 pounds of acetic acid worth \$4.56, and three-quarters of a ton of stock feed worth \$17.25—a total of \$33.81. As a result of the experiments a \$500,000 plant is under construction in Louisiana which will use sawdust and pine refuse in the manufacture of 5000 gallons of ethyl alcohol a day. This is a decided advance from the use of sawdust, slabs and other mill waste and limbs and stumps of trees in obtaining, by the destructive process or by the steam process, turpentine, tar, charcoal and heavy oils. There were 117 establishments in 1910 using hardwoods for the derivation of charcoal, crude wood alcohol and gray acetate of lime. Six of these plants were in the South. But of the 30 plants using softwoods, four were in Alabama, six in Florida, five in South Carolina, four in Georgia, two in Louisiana and five in North Carolina, and the amount of wood consumed by them increased by 130,093 cords, or at the rate of 208.6 per cent., while the material consumed in hardwood distillation by plants principally outside the South increased by 168,319 cords, or at the rate of 13.1 per cent. only.

Southern forests are the main dependence for the supply of naval stores, an important item in the industrial life of the country, as well as in its export trade. Of the total 555,000 casks of 50 gallons each of spirits of turpentine, valued at \$17,680,000, which were produced by the South in 1910, 298,000 casks were produced in Florida, 139,000 casks in Georgia, 47,000 casks in Alabama, 35,000 casks in Louisiana and Texas, and 17,000 casks in North Carolina and South Carolina. Of rosin, 1,906,000 barrels of 500 pounds each, valued at \$18,255,000, were produced in that year. Florida produced the largest number, 1,018,000; Georgia, 487,000; Alabama, 173,000; Mississippi, 119,000; North Carolina and South Carolina, 63,000, and Louisiana and Texas, 46,000 casks. The growth of the industry is indicated in the increase in the production of spirits of turpentine from 141,824 casks in 1880 to 555,000 casks in 1910, the largest amount in any one year having been 731,000 casks in 1908. The number of products of resin, or crude turpentine, has likewise increased, and includes, in addition to spirits of turpentine, distilled from it, and rosin, the residuum of this distillation, oil of rosin, oil of tar and pitch, while the uses of the products, once confined mainly to shipbuilding, have greatly expanded, and they enter into the manufacture of paper, soap, varnish, paint, lubricants, electric wiring, medicinal preparations, roofing materials, linoleum, oilcloth, ceiling wax, fly paper and ink.

The phenomenal advance in the price of spirits of turpentine from 22 cents a gallon in 1896 to 60 cents a gallon in 1910 and to \$1 and more a gallon early in 1911, and in the price of rosin in the last two or three years from \$2 or \$2.75 a round barrel to nearly \$16 a barrel, was to some extent speculative in its character, but it had substantial reasons, also, behind it. The question of supply has been largely the great influence. Supply has depended upon changes in labor conditions from a time 20 years ago when the laborers were plentiful and reliable until today, when their number and their reliability have greatly lessened, upon increased cost in the manufacture of turpentine and

upon the lessening areas of the pine forests. The question of diminishing sources of supply was discussed at the time as follows:

"The fact that the forests are gradually disappearing of necessity means that a constantly diminishing supply will result. This means that with no greater demand than prevails at this time that prices cannot be lowered except at intervals. But when it is considered that the demand for naval stores is increasing, the question naturally arises, Where will prices eventually stop?

"It is certain that more care will be taken of the pine in the future than ever before. Its value is coming to be realized by the owners. In a word, the high prices of the products of the pine means that conservation starts automatically in that direction. Nothing that could be done would prove more potent in the way of taking care of the forests than the advance in the price of its products.

"The belief is general that with the growing high prices scientists will endeavor to find some substitute for naval stores that will serve to cheapen or at least retard its upward march.

"The use of cups, instead of cutting deep boxes into the trees, will be more common from now on. They are getting in use more and more each year, and as they are now easily procurable, it is certain that their installation will become the rule instead of the exception."

It is hardly likely that any entirely new uses for lumber will be devised. It is likely that proportionately fewer houses in the future will be built of wood, and that brick, tiles and various other clay products, iron and steel, cement and reinforced concrete, will play a larger part in construction work of all kinds. The signs of the times are in the increase in the lumber cut between 1900 and 1910 from 35,067,595,000 to 40,018,282,000 feet, equal to 14.1 per cent., compared with the increase in steel production in the same period from 10,188,329 tons to 26,094,919 tons, or by 15,906,590 tons, equal to 156 per cent., and in the manufacture of Portland cement from 8,482,020 barrels to 75,699,485 barrels, or by 67,217,465 barrels, equal to 792 per cent. Resources for the manufacture of steel are still far within the limits of demand for many years to come, the materials for the manufacture of Portland cement are practically inexhaustible, but it is obvious that with timber being cut much more rapidly than the natural reproduction of forests may take place, the end of lumber as a fundamental source of wealth must come within comparatively few years unless there be a radical change of policy in handling the remaining timber of the country.

Up to 1850 the Northeastern States produced the bulk of this country's lumber and they maintained their position in that respect for twenty years longer, but between 1860 and 1870 the cutting of white pine in Michigan, Wisconsin and Minnesota had a great increase, and by 1880 these three Lake States were cutting \$77,768,313 worth of the \$233,268,729 worth of lumber cut in the country and ranked first among the groups of States. In that year the South's cut was worth \$45,246,045, and the three Pacific States had a cut valued at \$59,292,073. By 1900, however, the value of the South's cut had risen to \$194,203,298 and was greater than that of any other group of States in the country, exceeding the value of the Lake group by about \$40,000,000 and constituting nearly 35 per cent. of the value of the total cut in the country. The year 1910 was one of depression in the lumber industry, with a decrease in the cut of 4,567,000,000 feet from the preceding year. Only one Southern State, Louisiana, had an increase, and most of the increase was in States west of the Rocky Mountains. The temporary drift of lumbering toward the Pacific Coast thus indicated may hardly be regarded as an evidence of any decline in the long run in the Southern cut.

Therefore, it is a matter of congratulation for the whole country that the opening of this year marked the taking of definite steps toward the establishment of a great forest reserve in the Southern Appalachians. Early in January announcement was made from Washington that the contracts were being drawn for the purchase of 160,000 acres of land for this purpose, mostly in Virginia, Tennessee, North Carolina and Georgia, and that the next purchase would be of lands in West Virginia. The importance of this undertaking cannot be overestimated. The Appalachian Mountains bear the greatest number of species and the best qualities of hardwood growths in the country. In the southern portion of these mountains there are 58,000,000 acres of hardwood forest lands, of which 85 per cent. has been cut over or culled, but this land properly handled reproduces forest more rapidly than any other great area of the country except that of the Pacific Coast. The remaining growths of commercial stature and the new growths are the main reliance for the future supply of hardwood lumber. But toward the diminution of the supply not only are extensive lumbering operations contributing, but there is enormous waste through fires. Referring to this point, State Geologist White of West Virginia not long ago said that because there was no one on guard millions and millions of young trees in his State, spruce for instance, ready to spring into life when the original forest disappeared, are prevented by these fires, many of which are started by settlers simply for the purpose of getting a little wider area for cattle pasturage.

The fundamental intent of the Appalachian forest reserve is to assure a steady flow of great navigable streams whose head-springs are protected by the Appalachian forest stretching from Pennsylvania to Alabama. But worked out as the advocates of the undertaking plan, the reserve will assure to the country great stretches of timber to be protected by rangers from fire and other damage and to be handled in lumbering operations, so as to produce an income, but chiefly for the purpose of allowing young timber to attain its proper growth. What can be accomplished in this direction has been clearly demonstrated in the co-operation of Government experts with holders of vast tracts of timber land in the South, especially in Texas, and the application of science to the Appalachian reserve ought to result in changing lumbering operations from a policy meaning ultimate exhaustion to one of indefinite conservation of a source of great wealth.

Dominance of the South in Coke Production



COKE from bituminous coal was used successfully in iron-making in this country in a Southern furnace at Frostburg, Md., in 1837. A Marylander, J. H. Alexander, is credited with the preparation of the first comprehensive treatise published in the United States dealing with coke in the manufacture of pig-iron. That fact, brought out twenty-four years ago by Mr. James M. Swank of the American Iron and Steel Association, an authority on iron, fixing the early interest in coke, if not actual priority of production in Maryland, which was exporting iron in the early years of the eighteenth century and which is still using in one charcoal furnace the same kind of ore as that smelted in the middle of the seventeenth century, making an iron having a special market with the United States Government, were prophetic of the dominative importance that the South, possessing 75 per cent. of the known deposits of coking coal, is to have in coke production.

Fulfillment of the prophecy has not yet occurred, but tokens of its coming are multiplying.

There were not more than two or three furnaces using coke in States south of the Potomac and Ohio before 1860. The war interrupted attempts to establish others, but such progress was made after 1867, when the first of the Rockwood furnaces in Roane County, Tennessee, was built by General Wilder, that in 1886 there were south of the Potomac and Ohio forty-four completed coke furnaces and twenty-four being erected, 67 completed charcoal furnaces and three being erected, and three anthracite furnaces. In 1880 the South had 1988 of the 12,372 coke ovens in the country, or about 16 per cent. of the total, but by 1904 the number in the South had increased to 33,768, or 40 per cent. of the 83,497 in the United States. In 1910 there were 104,440 coke ovens in the United States, and of them 10,132 were in Alabama, 350 in Georgia, 495 in Kentucky, 200 in Maryland, 4 in Missouri, 408 in Oklahoma, 2792 in Tennessee, 5389 in Virginia and 19,912 in West Virginia, a total of 39,682 in the South. The change from the wasteful method of coke-making in beehive or partial combustion ovens to that of retort or by-product ovens began in this country in 1893, and in 1910 there were 4078 completed by-product ovens. Of that total 280 were in Alabama, 200 in Maryland and 120 in West Virginia, a total of 600 in the South. There were, though, 1200 of such ovens in course of construction at the close of that year, of which 60 were at Woodward, Ala., and 280 at Corey, Ala.

In 1880 the South made 373,982 tons of coke, or about one-ninth of the total make of the country. In ten years the South's output increased to 2,548,245 tons, or at the rate of 581 per cent., and the output of the rest of the country to 8,959,776 tons, or at the rate of 388 per cent. By 1900 the South was making 5,839,612 tons of coke, 75 per cent. more than the country's 1880 output, and in 1910 it made within 2,200,000 tons of the amount made in the country in 1890 and nearly three times as much as the total in 1880.

In thirty-two years the South's output of coke was 140,000,000 tons, which was 25 per cent. of the country's in that period, but, where its production in 1880 was but 11.2 per cent. of the total, in 1911 it was about 22.5 per cent. of the total.

If all the Southern coal used for coke were used in the South its proportion of the total output would be larger. But much coal is shipped for coking to Illinois and Massachusetts from West Virginia. Moreover, about 98 per cent. of West Virginia's coke is shipped from that State. That points to a condition in which the strength of the South as the great producer of coking coals is to be signally shown.

To many minds coal is coal, and there is such an abundance of it that the thought of its exhaustion is hard to be fixed. But all coals have not the properties making them suitable for coke to be used in iron-making. So rapidly has that industry developed the consumption of coke, and so comparatively limited is the stock of coal from which it can be made, that careful investigators are on the alert to possibilities, and one of them, Charles Catlett of Staunton, Va., well known as

a mining engineer, urged two or three years ago that the measures of coking coals of high quality be determined accurately and then reserved for coking purposes alone so as not to be wasted in operations for which other coals might serve just as well.

Twenty-two States produce coal used in the manufacture of coke. Seven of them have the great bulk of the known supplies deemed best-fitted for coke for iron-making. One of the seven States, Pennsylvania, still leads in coke production. It has more than half the coke ovens of the country and is making 53 per cent. of the coke. But it is realized that at the present rate of mining to meet the demand for coke, which has brought about within a few years a rise in the price of coal lands in the Connellsville region from \$1000 to \$3000 and more an acre, the field must be exhausted in a short time, as brief as twenty-five years, according to some estimates. Shipments of coke or of coals to be coked elsewhere from West Virginia, Virginia and Kentucky, three of the half a dozen States in the Appalachian South, where lie 75 per cent. of the coking coals of the country, according to Prof. John J. Porter of the University of Cincinnati, are signs of the change under way and reflections of investment in coal lands and in coke ovens in that region by large corporations which once looked to Pennsylvania for their main supply.

Twenty-five years ago the Manufacturers Record expressed its conviction of the superiority of the coking coal of this southern highland region, and the amazing development of the iron and steel industry since then has hastened the day of the full opening up of this vast storehouse of fuel. In one field alone, the Elkhorn, in Eastern Kentucky, three concerns now own an aggregate of 300,000 acres of coking coal land, and recent investments in coal lands and coking plants in the whole region have amounted to \$20,000,000 or \$30,000,000, to say nothing of other millions of money spent by railroad systems aiming to be the outlets for the traffic that is bound to follow.

In spite of the shipments to other States of its coking coals, West Virginia

has ranked second among the States in coke production for some years, Pennsylvania being first in 1910, Alabama third, Illinois fourth, by virtue of the product from West Virginia coal, and taking thus the place held by Virginia for some time, and Virginia fifth. The closeness in production of West Virginia and Alabama has led Edward Wheeler Parker of the United States Geological Survey to say:

"In the quantity of coke produced West Virginia has for several years held second place among the States, but is outranked by Alabama in the value of the product. The reason for this lies in the fact that the output of Alabama has in the iron-manufacturing center of Birmingham and vicinity a local consumptive market, whereas practically all of the West Virginia coke is shipped to furnaces outside of the State. In reaching for these markets the coke of West Virginia not only has to meet in competition the product from other States, but one district in the State becomes a rival with other West Virginia districts, and the result is exhibited in the statistics of production and value. * * * Next to Pennsylvania, West Virginia possesses more wealth in supplies of coking and other high-grade coals than any other State in the Union, but as long as both the coal and the coke are continued to be shipped out of the State, West Virginia will not attain the position she should occupy as a manufacturing State, nor will the miners of coal and makers of coke receive a just return for their products."

Therefore, the true conservation of the supplies of coking coals in the South possessing 75 per cent. of the total quantity in the country is in the using such coals for coke only and using the coke in iron-making within the South as near as possible to the centers of production. It is the part of wisdom to provide that coals fit for coke to be used in the manufacture of pig-iron shall be saved for that purpose alone. It is greater wisdom to use such coals as a means of making the South the situs of iron-manufacturing in this country.

SOUTHERN COKE PRODUCTION.

(Tons of 2,000 Pounds.)

States.	1880.	1890.	1900.	1910.
Alabama	60,781	1,072,942	2,110,837	3,249,027
Georgia	38,041	102,233	73,928	43,814
Kentucky	4,250	12,343	95,532	53,857
Maryland .....	.....	.....	.....	335,361
Missouri .....	.....	6,136	2,087	.....
Oklahoma	1,546	6,639	38,141	*
Tennessee	130,609	348,728	475,432	322,756
Virginia .....	.....	165,847	685,156	1,493,655
West Virginia	138,755	833,377	2,358,499	3,803,850
Total	373,982	2,548,245	5,839,612	9,302,320
United States	3,338,300	11,508,021	20,533,348	41,708,810

*No separate figures.

PRODUCTION OF COKE.

(Tons of 2,000 Pounds.)

Years.	The South.	United States.
1880	373,982	3,338,300
1881	487,526	4,113,760
1882	623,730	4,793,321
1883	778,691	5,464,721
1884	834,207	4,873,805
1885	906,689	5,106,696
1886	1,223,262	6,845,369
1887	1,437,840	7,611,705
1888	1,692,138	8,540,030
1889	2,264,290	10,258,022
1890	2,548,245	11,508,021
1891	2,976,551	10,352,688
1892	3,167,127	12,010,829
1893	2,773,415	9,477,580
1894	2,718,565	9,203,632
1895	3,463,948	13,333,714
1896	3,840,776	11,788,773
1897	3,736,593	13,288,984
1898	4,620,418	16,047,209
1899	5,289,602	19,668,569
1900	5,839,612	20,533,348
1901	5,940,716	21,795,883
1902	7,017,493	25,401,730
1903	7,577,124	25,274,281
1904	6,632,750	23,661,106
1905	8,547,863	32,231,129
1906	9,358,969	36,401,217
1907	9,554,656	40,779,564
1908	6,686,705	26,033,518
1909	9,047,399	39,315,065
1910	9,302,320	41,708,810
1911*	9,000,000	40,000,000
Total	140,263,202	560,761,379

*Estimated.

The Cottonseed Industry Created From a Practically Waste Agricultural Product



THE 137,000,000 tons of cottonseed produced since 1880 in this country, 62,000,000 tons have been crushed at the mills, and the progress of this crushing is shown in the fact that the amount of seed crushed annually has increased from about 500,000 tons, or one-fiftieth of the annual production, to nearly 5,000,000 tons, or four-fifths of the annual production.

Pointing to the wealth to be derived from the utilization in industry of products long held to be waste is the history of the cottonseed oil industry of the past 30 years. In 1880 the capital interested in the industry amounted to \$3,862,300 and the value of its crude products was \$7,690,921. By 1890 the capital invested had increased to \$12,808,996 and the value of its products to \$19,790,000. Since then the capital has increased to \$97,000,000 and the value of the products to \$150,000,000. The products of 1890 were 40,930,000 gallons of oil, valued at \$11,460,000, and 358,000 tons of cake and meal, valued at \$8,330,000. By 1910 the annual production rose to 167,970,000 gallons of oil, valued at \$80,430,000; 1,792,000 tons of cake and meal, valued at \$44,660,000; 1,375,000 tons of hulls, valued at \$11,370,000, and 379,576 bales, of 500 pounds each, of linters, valued at \$6,250,000, a total value of \$142,710,000.

Though it has practically been added to the important industries of the country since 1880, cottonseed crushing is, after all, but the carrying out of one of the many projects to which Southern men of 50 and 60 years ago paid a great deal of attention. Referring in 1859 to a number of articles he had written for the encouragement of the cottonseed oil industry, Charles Cist of Cincinnati wrote that they had made a profound impression throughout the South because of the magnitude of the pecuniary interests involved and that numbers of men were anxious to engage in the industry. He argued that in spite of the gradual development of cottonseed crushing at Memphis, New Orleans and St. Louis, it was the duty of each planter and to his interest to manufacture his oil and cake, using the hulls and waste for fuel, and he estimated that the profits in the manufacture of the cottonseed of the season of 1858-59 would have been greater than the profits from the sale of the lint. That estimate was akin to the later one of Edward Atkinson, the well-known Boston statistician, who looked forward to the time when the cottonseed might be as valuable as the lint. In those early days, so little regard was had for the seed not used for planting that there were laws in some places compelling cotton gin owners within half a mile of a settled community to destroy all the cottonseed from the gin so as not to prejudice the health of the people and forbidding the throwing of the cottonseed into any stream of water used for fishing or for drinking purposes. At the same time, Cincinnati and New Orleans were manufacturing cotton oil, from which was derived salad oil, paint oil and soap stock, while in one city gas for illumination was derived from cottonseed cake, and the discovery of oil in Pennsylvania was expected to reduce the price of cotton oil for illuminating purposes from 80 cents to 60 cents per gallon. It was pointed out that the hulls and waste of the seed

might be used for fuel, that the refuse cake might be used for feeding cattle and hogs, for distillation and for fertilizer, and that the fiber of the stalk might be used in making rope and paper. In 1856 Edgar Conkling of Cincinnati wrote:

"No one item of residue going to waste in this country will compare in utility and value to cottonseed, and with a little attention on the part of those interested and capable of appreciating it, the South in a few years may reap \$50,000,000 annually from net receipts from working it up."

By 1901 this forecast was more than fulfilled; for, in that year the value of cottonseed products was \$62,980,000, although the price of cotton oil was but 28 cents a gallon. By that time, too, the hulls had acquired considerable value, 1,487,000 tons of them bringing \$6,320,000, and the linters, products of the cleaning of the seed before crushing, amounted to 145,103 bales, valued at \$1,520,000, while 1,125,000 tons of cake and meal brought \$21,930,000. By that time the broad lines upon which the industry is still to develop had been fairly well mapped out.

At the mills there are three main derivatives from cottonseed — linters, hulls and meats. Linters are the short fibres of cotton left on the seed after ginning which must be removed by the delinting process before the crushing. About one ton of seed yields from 20 to 30 pounds of linters, which are used in the manufacture of batting, wadding, absorbent cotton, felt and various stuffing materials.

That is but the beginning of the use of the wastes or by-products of what was regarded 50 years ago as a waste product itself. The same ton of seed yields about 1000 pounds of hulls separated from the meats in the shakers and beaters. At first these hulls were cast into the fire and their ashes containing much potash, were used as fertilizers. Growing knowledge of their feed value has been carried to such an extent that the bran from their shells, after the removal of the fiber, used as stock for fine paper, becomes an ingredient of cattle feed.

The meats, cooked and pressed, give the oil, and the residual cake and meal go into fertilizers because of the value of their ammoniates, into dye-stuffs, feed for live stock and poultry and food for human beings, in the shape of confectionery and flour. The oils have a variety of uses as food and in the industries and arts, and only a few months ago announcement was made of the invention of a process to derive from the ultimate offal of the industry a substance having the economic qualities of pitch without its inflammable characteristics.

In recent years increasing demands in this country for cottonseed products resulting from intelligent publicity work by the manufacturers have been influential in reducing the proportion of them exported and a growing appreciation of the value of the products as food and the expansion of their use in the manufacture of fertilizer and in other lines is likely to make the proportion in exports still less.

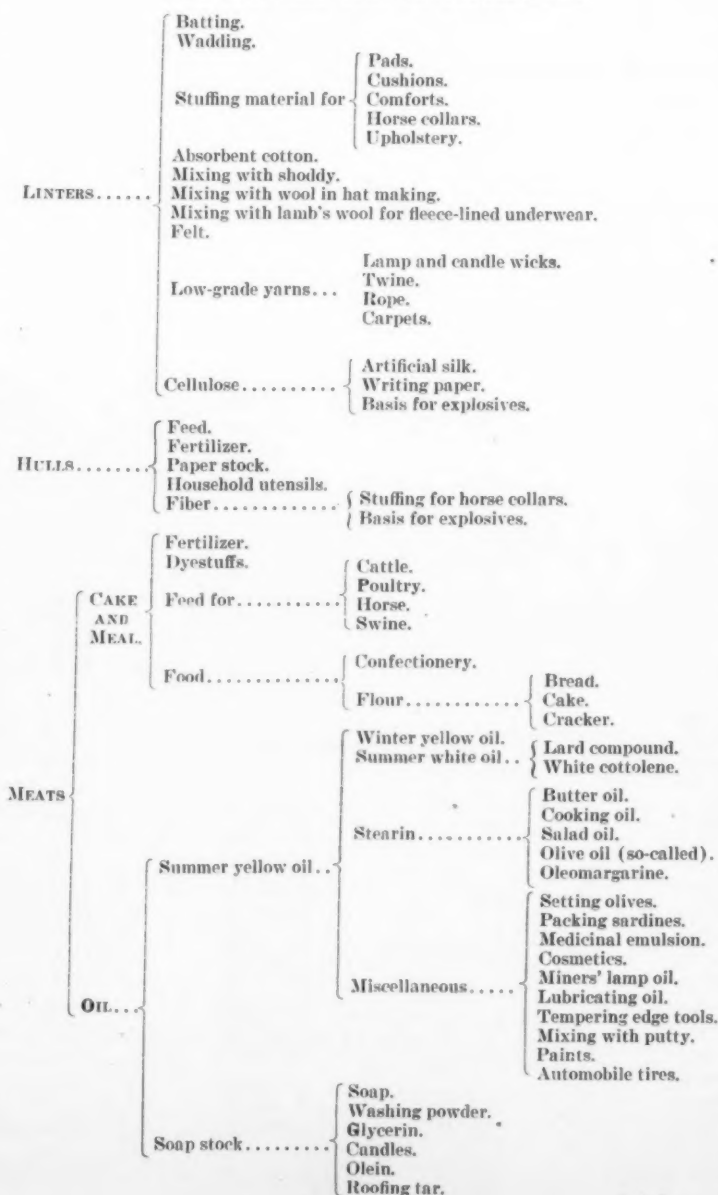
What may be described as a cottonseed genealogy appears in the accompanying diagram.

VALUE OF CRUDE COTTONSEED PRODUCTS.

States.	1880.	1890.	1900.	1909.
Alabama	\$247,982	\$1,203,989	\$2,985,890	\$8,714,000
Arkansas	590,000	1,881,668	3,188,812	7,700,000
Florida				514,000
Georgia		1,670,196	8,064,112	17,084,000
Kentucky			4,683,343	
Louisiana	3,739,466	1,573,626	7,026,452	4,497,000
Mississippi	560,363	2,406,628	6,681,121	15,469,000
Missouri	140,000			648,000
North Carolina		529,900	2,676,871	6,199,000
Oklahoma			874,355	5,180,000
South Carolina		927,746	3,103,425	10,170,000
Tennessee	1,235,000	2,504,741	2,980,041	5,083,000
Texas	276,450	3,262,596	14,005,324	25,034,000
Virginia	8,000			
Total	\$6,797,261	\$15,961,090	\$56,269,746	\$106,292,000
United States	\$7,690,921	\$19,335,947	\$58,726,632	\$107,538,000

Figures of 1890 do not include the output of two establishments in Florida and two in Kentucky. Figures of 1900 do not include one establishment in Florida and two establishments in Missouri and those of 1909, two in Kentucky.

PRODUCTS AND USES OF COTTONSEED.

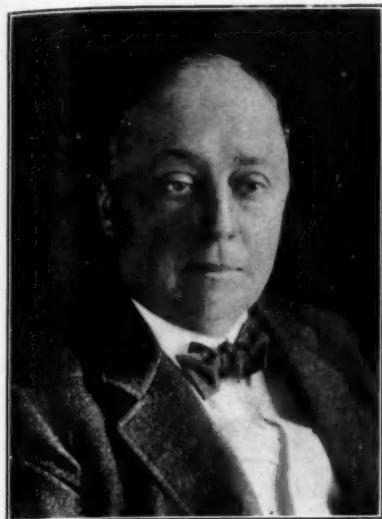


Members of the President's Cabinet and Other Men of Affairs on the South's Future

South's Assets Unequalled in the World.

DEPARTMENT OF STATE,
WASHINGTON.

The commercial possibilities of the South, gauged by the potentialities of her natural resources, are unbounded. With well-directed enterprise and wisely invested capital the South will surpass in the not distant future those wonderful strides of material progress which in the last thirty years have distinguished that progress as phenomenal.



In soil and climate and in geographical location with respect to the great waterway soon to be available for new channels of trade, the South possesses assets unequalled in all the world for the production and distribution of cotton and grain—the greatest staples of commerce.

Pre-eminent as the source of cotton, the South will come to realize the economic value of crop diversification. Naturally turning to the encouragement of a greatly increased production of corn, the South will rank among the greatest sources of the world's supply of this most necessary grain. With a general diversity of crops there will follow the fertilization of soil needed to bring about the increased yield of cotton of which the South is capable. Two bales should be produced where now but one is grown.

The prominence now attained by the South in producing fabrics of cotton is only the beginning of the manufacturing development sure to follow. The latent power of her rivers, harnessed to drive the mills of the South, will enable that region year by year more and more to convert her abundant raw materials into finished products, the increment whereof will be counted in the hundreds of millions of annual profit.

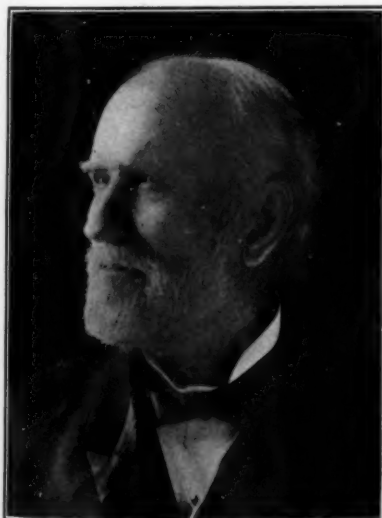
Very truly yours,

J. M. Wilson
Secretary.

Optimistic View of Southern Agriculture

DEPARTMENT OF AGRICULTURE,
WASHINGTON.

I am gratified to learn from your letter of January 3 that you are preparing to issue a special publication entitled "Thirty Years of Southern Upbuilding" in celebration of the thirtieth anniversary of the founding of the Manufacturers Record. I congratulate you heartily upon the successful outcome of your long and earnest labors in upbuilding this great publication of yours. It has been, in my opinion, a very important and useful factor in upbuilding the South.



Since I have been at the head of this Department I have, as you know, taken a keen interest in the agricultural progress of the South, and I have seen the very noticeable advances made by the Southern States of recent years, but when I think of the South's advantages in natural resources and geographical location, I can see in the future still greater progress along all lines,

and especially in agriculture. With the progress made in the diversification of crops, in the eradication of the cattle tick, in the improvement of cotton by seed selection, and in the very remarkable increase in the corn crop, agriculture in the South has the brightest possible future. Perhaps the best reason of all for taking the most optimistic view possible of the future progress of the South in agriculture is the awakening of the farmers to the possibilities of their occupation. They have every reason to look forward with confidence to a bright and prosperous future, with ample reward for their industry and intelligence.

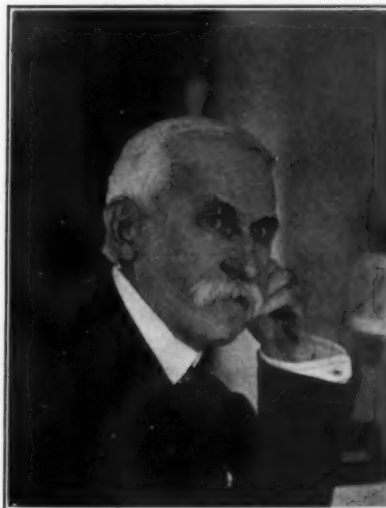
Very truly yours,

James Wilson
Secretary.

Abiding Faith in the Southern States.

TREASURY DEPARTMENT,
WASHINGTON.

I have always had an abiding faith in the wonderful future of our Southern States. This future is full of all sorts of possibilities. While the adaptability of the soil of the South to diversified farming, its equable climate, its timbered lands, its coal and iron deposits, its natural watercourses and the increasing expansion of railroad interests are all vast wealth producers, and while, as these resources are developed, capital will be attracted and created and enterprises will multiply, and material progress will be complete, all the other elements of a great people's development will be keeping pace step by step.



The South has enjoyed a practical monopoly in the growing of cotton, and formerly this was the one important product, and business conditions were largely dependent upon the amount of this staple produced and the price obtained for it. But this condition no longer exists. Varied agricultural activities have been extended, natural resources developed and manufactures established.

Thirty years ago the production of cotton alone was many millions in excess of the manufactured articles, but today the value of the manufactures of the South is many millions greater than the agricultural output. It is safe to assume, however, that present manufactures fall very far short of what they will become within the next few years; for there is every economic reason why Southern products should be prepared for final consumption in Southern manufacturing establishments. The opening of the Panama Canal will carry to the South great new possibilities; and it behooves your people to be active, even already, in order to come into their rightful heritage.

So that from all points of view I know of no section of the country whose future possibilities are more certain or more attractive. But the greatest prospects of the future of the South are bound up with the ever-increasing actual unity of the North and the South; and the thing upon which all the people of the nation can and ought to most congratulate themselves is the fact that all the obstacles to a complete union of both ideas and interests have nearly or quite passed out.

Very truly yours,

Franklin MacNeagh
Secretary.

Potent Influence of the Panama Canal.

WAR DEPARTMENT,
WASHINGTON.

I have a strong belief that the opening of the Panama Canal and the consequent development of American influence and trade throughout the West Indies and along the coasts of the Caribbean Sea will have a potent influence in developing the business of the Southern United States. For example, I look to see New Orleans and the mouth of the Mississippi become the gateway of a great volume of trade between the States of our Mississippi Valley and the new markets which will be opened through the Panama Canal and throughout the West Indies. This will not occur, however, unless our Southern business men themselves are alert and ready to take advantage of their great opportunity. Every step which will stimulate and assist them in doing this should be encouraged.



Very truly yours,

H. C. Thurston
Secretary.

Most Wonderful Growth Will Be in the South

By HON. CHAMP CLARK, Speaker of the House of Representatives.

The growth and development of the South during the last four decades has been phenomenal, and all signs indicate that it will be even greater in the next 40 years.

Of course, the whole country will advance, but my judgment is that the most wonderful growth will be in the South.

Past 30 Years an Imperfect Indication of Future

By HON. WOODROW WILSON, Governor of New Jersey, Trenton, N. J.

No one who knows the South can look forward to her future without the most confident expectation of an extraordinary development. The character of her people, of her resources and of her climate assure a development which will be one of the most notable features of the growth of America in the twentieth century. The past thirty years will be but an imperfect indication of what the next thirty will bring forth.

Greater South Means a Greater Republic

By FORMER VICE-PRESIDENT CHARLES W. FAIRBANKS of Indianapolis, Ind.

I have been familiar with the development of the South during the larger part of the last 30 years. It has been as gratifying to me as it has been remarkable in its solidity and extent. The New South is not an idle fancy; it is a real and substantial fact. The expansion of manufacturing, the growth in the upbuilding of cities, the improvement of railway transportation, the development of mines, and so on, are, I believe, only the beginning of a greater South. There is no portion of the United States which is so full of opportunities along wholesome lines as the great South. She possesses a happy combination of agricultural and manufacturing possibilities, the full extent of which we cannot foresee, but no one who has watched her forward movement during the last two or three decades has any doubt as to her great development. I send you with pleasure my hearty congratulations and best wishes for your future success in your manifold activities. A greater South means a greater North, East and West; it means a greater Republic.

South's Invaluable Asset in Men of Affairs

By GEORGE W. PERKINS, New York.

I am very glad you are going to issue a special publication to be called "Thirty Years of Southern Upbuilding." It is high time that something worth while was compiled on this subject, and I am sure you will do it in a thoroughly creditable manner. I have been paying visits to the South every year for a number of years, and through business undertakings and other ways have been in pretty close touch with the developments that have been going on down there and have been very much impressed with all that I have seen and learned, and if I were to boil down into one statement the impression it has made on my mind it would be that there is today in the South a very happy combination of what used to be known as the New England conservative methods with the Western progressive ideas. Coupled with this is the broadest possible spirit of tolerance and a feeling that many of our great business and commercial questions must be settled along very broad and big lines.

In connection with these questions I have been much impressed with the large number of letters I have received from men in all sections of the South this year touching on the corporation or so-called "trust" questions which are now so prominently before the country. In a large majority of cases these letters show the deepest and broadest sort of thought on the subject and express the feeling that we have reached a point where large business concerns are necessary to the further upbuilding and development of our domestic and foreign commerce, and that we must look upon these concerns as more or less national in their character and foster and develop them for the best good of one and all here, there and everywhere. I am convinced from all that I have seen in the South and from my talk with the men of the South that in their contemplation of the problems now before the American people they are exhibiting a breadth of view and unselfishness that is going to be of the utmost possible value to the whole country in the proper working out of the questions that are before us.

All this means that the South has in her men of affairs today an invaluable asset and one that is bound to bring her great prestige in the next quarter of a century. The foundations are being well laid; the work of the last ten years in the South has been well done, and because of the excellent character of this preparatory work I believe there is no section of the country that will show as great material progress in the next 25 years as will our Southern States.

For an Application of the Science of Efficiency.

By M. W. MIX, President Dodge Manufacturing Company, Mishawaka, Ind.

It has been my good fortune to be given more than an ordinary opportunity of becoming familiar with the South, its achievements and possibilities, and I have no hesitancy in expressing the opinion that when the South fully comes into her own—when her people fully awaken to the immense advantages of natural resources, climate and shipping facilities, and will apply the same principles of development that have advanced the conditions of other sections, there can be no question of her industrial and agricultural supremacy. When they actually do, instead of prophesying; when they become "issuers" instead of "going-to-bes;" then there will be brought into action a latent force that

must necessarily win the place to which they are entitled by every gift of a gracious God.

Water-power developments, good roads in the agricultural sections, bringing into closer city and town connections outlying low-priced lands of greatest fertility, industrial education, all need the most earnest support of her citizens and capitalists. There is no reason why outside capital should be awaited for such improvements. There should be no profit-sharing of these developments, for the South has the money to finance such improvements beyond immediate needs, but she does not always show her faith in her own possibilities by getting into action.

Why should the raw materials and partly manufactured supplies be shipped to other sections of the country for further manufacturing, the value of it increased many fold and much of it returned at a highly increased cost for home consumption, when the conditions are most favorable for performing these operations at home, saving losses in freights and annihilating time, and enjoying thereby the increased income produced to her capital and her labor?

A careful study of the new science of efficiency should be made by all the South, and the story would soon be told. Be it said and granted that it is being told now—but so much more slowly than it could be told—that we are apt to lose perspective.

I wish to congratulate and commend you upon the great work done in developing the South.

No More Inviting Field in World

By F. A. VANDERLIP, President the National City Bank of New York.

Last spring I made an extensive trip through the South, and everywhere was greatly impressed by the remarkable development and progress of that section. I may say that I was astonished not only at what has been accomplished, but at the richness and abundance of natural resources yet to be developed. There is no more inviting field in the country nor in the world for the profitable employment of capital. When these natural resources are properly exploited, capital must and will be available for every legitimate requirement.

The only difficulty in the way of the influx of capital so far as I could observe is that in some of the Southern States the laws, if not actually hostile, are certainly not calculated to encourage outside investors.

It is a source of gratification to note that the business men of the South are waking up to this fact, and their efforts to improve the laws cannot fail to result in great benefits.

The South is contributing in the production of cotton alone by far the most important item in our international trade, and is capable of producing much more in sugar, rice, timber, cattle, fruits, oils and mineral products, also manufactured goods. It is manifestly to the interests of the people of that section not only to make known the diversity of the South's resources, but to invite and encourage in every legitimate way the help and co-operation of Northern capital, and especially to seek to bring about the settlement there of Northern farmers and manufacturers.

Center of Trade to Shift Southward

By E. W. EDWARDS, President The Edwards Mfg. Co., Cincinnati, Ohio.

I believe few Northern business men realize fully the position the South is in at the present time, but what is more important, her position when the Panama Canal is opened. Flagler's railroad in Florida is in itself a tremendous undertaking and puts the South within a few hours of Cuba. The opening up of the Clinchfield coal fields and the roads leading from the coal fields to Savannah and Charleston will give these ports international prominence in the coal industry. The improvement going on in New Orleans will make that city second only in importance to New York as a port, to say nothing of Galveston and Mobile. Trade will flow through these centers, which will quicken the life of the entire South and help the development of the South which has been moving so swiftly for the past ten years. The improvement of the Ohio and the Mississippi will mean much to the entire Mississippi Valley. The Panama Canal will be a loadstone which will shift the center of trade, and this shifting will always be in favor of the South.

In an Era of a Great Awakening

By PAUL T. BRADY of the Westinghouse Electric & Manufacturing Co., New York.

In response to your request as to my opinion regarding the South, would say that I believe that section of the United States has a great asset in its uniform and mild climate. It has more undeveloped natural resources than any other section in its coal, iron, lead, marble, gypsum and other minerals, timber and great agricultural possibilities, as well as undeveloped water-powers, and that it is in an era of a great awakening.

What the South needs today is money and the momentum which comes from the infusion of new blood, and with money its other great need will be satisfied, namely, additional population. To get money its laws must be, as they are at present, reasonable, fair and just to capital. It must not be carried away and follow the lead of more developed sections, like New York, Massachusetts, Wisconsin and other States, where drastic public utilities commissions are now in existence and in which States no new developments are going forward.

To take a part in the development of new industries money commands and will have some kind of a premium, and if restricted, as many of the aforementioned commissions of other States are now attempting to do, to limit the returns on new enterprises in undeveloped undertakings to the same income that old and settled industries are paying, it will go elsewhere, even to Mexico and South America, as well as China. Therefore, I advise reasonable and just laws, and with these conditions prevailing I look for the next 30 years of the

South to be the greatest in its history in the development of its industries and commerce and growth of its population.

Southward Trend of Development Should Lead to Growth Beyond Scope of Imagination

By JOHN F. WALLACE, President Westinghouse Church Kerr & Co., New York.*

Prior to the Civil War, when cotton was king, the South was practically the home of the aristocracy and culture of the nation.

When the flood of European immigration settled and developed the great Middle West, and subsequently the empire beyond the Mississippi River—the Southwest, West and Northwest—this wave of development left the South practically untouched, being diverted along the channels which it followed by three causes: First, the physical barrier, due to the Appalachian range; second, the political barrier created by the Mason and Dixon's line; and, third, by the efforts of the great trunk lines reaching the West and Northwest from the Atlantic seaports centering in New York city in co-operation with the steamship lines from Europe which exploited the tide of immigration and directed and controlled its flow.

In recent years, since the virtual settlement of our public domain, more attention has been given to the South and it has gradually surmounted the climatic, political and racial causes which have heretofore much restricted its full development; and the commercial and industrial movements in the South during the last ten years have indicated a trend in that direction which should ultimately lead to a development far beyond the present scope of the imagination of its most enthusiastic friends.

The investigations of the writer into the resources of the South, due to his investigation of various railroad enterprises, have opened his eyes to the immense possibilities of development which lay in that direction, provided the various interests that are connected with the development of the South awake to a full realization of these possibilities.

The South today has a climate and fertility of soil and natural resources which are unsurpassed by any section. The South today needs, above all, wisdom in the conduct of its political affairs, and conservatism and sanity in its local legislation, that will win the confidence of capitalists and bring into it the necessary capital for its full and free development, with the assurance that it will receive proper protection from the attacks of irresponsible politicians and assurance of its future safety and productiveness.

Beyond all this, it also needs a systematic co-operation between its transportation, mining, manufacturing and agricultural interests in introducing an intelligent and concerted effort to secure sufficient competent labor for its development. In other words, the future success of the South can be materially expedited and will give results beyond calculation by an harmonious union of brains, capital and labor, and this is necessary for its full development.

It seems strange that the great West should now be searched for occasional spots susceptible of irrigation, the land of which, after being provided with water, is sold for \$100 an acre upwards, when the hundreds of thousands of acres of land in the South, much nearer good markets, lie in an undeveloped state and which can be purchased for approximately one-quarter that sum per acre.

The possibilities of development in that direction should be easily appreciated when it is considered that within the last 50 years the population of the United States has increased three-fold, whereas the unoccupied tillable land is much less than 5 per cent. of the amount which was available 50 years ago.

If the same amount of capital, brains and energy were expended and if the same policy was used by the various railroad and industrial interests in the South to assist immigration and to settle and develop its waste portions, in co-operation with the various steamship lines, that was used in the settlement of the great West and Northwest, the South could be made the richest and most flourishing portion of our country.

On account of my previous experience and training, my thoughts are naturally directed to the important factor which transportation facilities can render and to the fact that from my point of view the great problem which will confront the South within the next few years is adequate and economical transportation facilities.

The railways and transportation companies of the South have heretofore labored under the annoyance of adverse legislation and the embarrassment of adverse public opinion which have made it difficult to obtain the necessary capital for the development and extension of existing transportation facilities, and I cannot but feel that the over-conservatism of the owners and controllers of the Southern railway systems will prevent adequate provision for the future unrestricted growth of the South unless their policy is changed, and I feel that this can best be brought about by a mutual understanding of the interests of each other upon the part of those engaged in the transportation, mining, manufacturing and agricultural interests and in the creation of a united policy which will educate public opinion towards the realization "that any injury to one is an injury to all and that the prosperity of one is the prosperity of all."

As Carnegie Views the South

By ANDREW CARNEGIE, New York.

I am deeply interested in the South and rejoice in her pronounced success regarding her future as certain to be astonishing.

*Mr. Wallace was for fourteen years chief engineer and vice-president of the Illinois Central Railroad and later chief engineer of the Panama Canal. During his connection with the Illinois Central that company spent more than \$100,000,000 on betterments and extensions.

South's Hour of Opportunity Has Struck

By W. H. MCINTYRE, Vice-President Manning, Maxwell & Moore, New York.

For thirty years the great field for investment has been the West and Middle West; the course of finance has been East and West. Notwithstanding the vast natural resources of the South, capital has been slow to seek investment there. Its temperate climate and great diversity of products make it the most inviting section of our country for agricultural purposes, yet less than half its fertile soil is in cultivation and farm lands are cheaper there than in any other part of the country.

With cheap fuel in abundance, and with a material for manufacture which the whole world needs and only the South can furnish, the cotton industry is in its infancy. The State which produces one-third of the cotton crop (from four to five million bales) does not operate within its confines half a dozen cotton factories, and does not consume, in the manufacture of cotton goods, five per cent. of the crop which it grows. With vast deposits of iron ore throughout this section, there is no adequate development of the iron and steel industry.

Some marked event has been needed to beckon capital Southward. When the construction of the Panama Canal began, the South's hour of opportunity struck. Its geographical advantages then became apparent. The completion of the canal will open to the South the vast markets of the Far East. Everything which can be will be manufactured there. The proper development of its great resources will require the investment of vast sums of money, but capital follows opportunity and the world's best opportunities are there. I am confident, therefore, that the story of the South's progress during the next thirty years will be the most marvelous example of commercial and industrial development that this country has ever afforded.

Exceptionally Rich in Natural Resources

By JOHN HAYS HAMMOND, Washington, D. C.

The South is exceptionally rich in natural resources, and therefore has the elements prerequisite to successful industrial development. Its climate is unsurpassed, and this is a feature of economic importance. It has an exceptionally advantageous geographical position with respect to accessibility of seaports, and this is an important factor, not only in the development of its domestic, but also of an important foreign trade.

The South, it is true, lacks an abundance of skilled labor, especially of the kind required for the production of the higher grades of finished articles. Vocational and technical schools will in time remedy this handicap.

The development of the industries of the South during the past few decades has indeed been extraordinary. As one who has the interests of the South at heart, I earnestly hope that the Southern States will not lose sight of the great importance in the economical development of its industries, which can be effected only through the enactment of wise legislation. Radical legislation would deter the investment of cheap capital in that section.

I trust that Southern statesmen will in time advocate a protective tariff suited to the development of the industries of their section. This is not an expression of political bias, but what I regard essentially as a factor of paramount importance, because the tariff is an economic and not a political problem.

Faith That Was Well Founded

By H. M. FLAGLER, Chairman Florida East Coast Railway, St. Augustine, Fla.

It is now twenty-six years since I commenced my investments in Florida, and I have never faltered for a moment in my belief regarding its great future, a belief which has been demonstrated by experience to have been well-founded; and what is true of Florida I believe to be equally true of all the States south of the Ohio and Potomac Rivers.

The book, "Thirty Years of Southern Upbuilding," I am sure will do you credit, and for it you have my wish that it will obtain a circulation and influence worthy of its publishers, which I regard as a very comprehensive wish.

For Investment of Brains and Money

By E. W. CLARK & Co., Bankers, Philadelphia.

We are spending large sums of money in the eastern section of Tennessee in the development of its water-power resources and in the electric-lighting and railway business. These expenditures, of course, evidence our faith in that particular territory. We believe that the section of this country usually known as the "South" has wonderful prospects for future development. With its great deposits of coal and iron lying near together, with its lumber, its vast cotton fields, its undeveloped water-powers, its climatic conditions and its cheap cost of living, we believe it is certain to become a favored field for the investment of the brains and money of our people.

Era of Unbounded Prosperity Ahead

By W. F. WHITE, President the White Investing Co., New York.

Old Mother Earth, after all, yields the foundation and starting point of all wealth building.

With productive soil and great stores of natural resources, on which all manufactures are based, and with momentum already attained, an era of unbounded prosperity is assured for the South, and of wealth to those who invest their money and spend their energy in good Southern undertakings.

Raw materials are there, and water powers and coal in abundance for driving machinery; cheap labor, established transportation facilities, and the

markets of the world are at hand. What more is wanted, when climate and good government are part of the inheritance? Why have thousands of American farmers and home builders gone to Canada, to an inhospitable climate, under a foreign flag, enduring great hardships, with much less chance of gain, and paying much more per acre for their lands, than if they had gone to the Sunny South? Simply because they did not know.

The tillers of the soil, the producers of raw materials, the laborers, the manufacturers, and the whole industrial train are in motion to the South to share in and enjoy the wealth creation that is assured there.

Believing large bodies of good raw materials are a firm foundation on which to build business enterprises, our Company is investing largely in the natural resources of the South, confident that prosperity there will grow and endure. In particular we are now developing the slate deposits of Virginia, which are recognized and classed by the United States government as of the best roofing slates in the world.

Has \$25,000,000 Invested in the South

By WM. N. SHAW, Vice-President International Agricultural Corporation, New York.

The progress you chronicle from week to week, and the information and statistics that will appear in "Thirty Years of Southern Upbuilding," are more impressive testimony than I can give as to the extent and virility of the South's advance along almost every line, moral and material.

In agriculture, with which, of course, this corporation is most intimately concerned, the South has shown the way for other sections to increase and improve crops by the use of commercial fertilizers, and other States, Western and Southwestern, are learning the lesson so well taught by the South and adopting its method so far as a relatively less favored climate permits.

But the South continues to be the largest consumer of commercial fertilizer, which, in the last year, reached a production of 5,750,000 tons, valued at \$125,000,000.

All but three of the twenty-four properties owned by this company, and many more in which it is interested, are located in Southern States. Besides fertilizer plants, these properties and interests include phosphate in Florida and Tennessee, and the enormous output of sulphuric acid from the copper smelters of the Ducktown district of the latter State, where the destructive fumes of the smelters have been transformed into a product of immense value in fertilization and made easily available for Southern consumption.

It was with full faith in the progress of the South, both as a producer and consumer, that this Corporation has invested more than twenty-five million dollars in Southern States. This is perhaps the strongest possible expression of belief in the continued progress of a section, old in social development, but young and vigorous in fulfilling the vast commercial and industrial opportunities contained in its soil, climate, geographical location and natural resources.

Hospitable Spirit as an Asset

By JAMES SIMPSON, Second Vice-President Marshall Field & Co., Chicago.

As manufacturers, importers and distributors of dry goods, we look to the South as promising territory into which we are rapidly extending our trade. A large percentage of our increased distribution of dry goods during the last few years has been in the Southern States.

One of the most noticeable features of the dry goods business in the South is that merchants throughout these States are demanding a better quality of merchandise than formerly. As an instance of this, certain brands of cheap domestics, that once found ready sale throughout the South, are now almost out of demand, and the mills are discontinuing the manufacture of them.

There is great satisfaction in dealing with Southern merchants because of the chivalrous, courteous treatment received at their hands. This hospitable spirit, characteristic of Southern people, is a great asset and will be an important factor in the commercial development of the Southern States. Capital will continue to find profitable employment in manufacturing and commerce in the Southern States. Home consumption will furnish an expanding market for many years, and South American trade will furnish an outlet for a large volume of the raw and manufactured products of the Southern States.

The opening of the Panama Canal will lend stimulus to Southern development, but this is only incidental to the progress that is being made in all lines. We believe that the South is assured of a continuous, healthy and substantial growth.

Amazing Deeds of Past to be Exceeded

By JOSEPH T. TALBERT, the National City Bank, New York.

Being a Southern man by birth and through generations of ancestors, naturally I feel the deepest interest in the South and in its industrial development and progress. What has been accomplished during the past thirty years truly is amazing. But splendid as these achievements are, they but mark the beginning of greater things which will be done in the future. That its bountiful resources will be completely developed, and that the whole South will continue to grow and prosper, cannot be doubted. Nothing can check the impetus which already has been gained. It is much more likely that the speed of development will be accelerated, rather than retarded, in the future.

As a true friend of the South, knowing as I do its riches, confident as I am of its destiny, I could voice no better wish in its real interest than that the people should break the shackles of prejudice and throw off the yoke of politics, which have so long impeded their progress. Let them cease to follow demagogues and false political leaders.

In the old days, when the differences between the two great political parties represented differences in fundamental principles of government, there

was reason for a solid South. But now, when those differences have been resolved into mere questions of temporary political expediency, there does not remain any reason for the South's loyalty to ghostly traditions of the past. A new era has come; new conditions confront us. This is a time for real statesmanship. The intelligence and conservatism of the South should be found in the lead in the great constructive work which is to be done, because no section has more to gain from such work, nor will any section more certainly suffer from a continuation of the destructive policies of the present. The South should take the lead in demanding that incorporated capital be regulated and controlled, but at the same time insist that the benefits of an efficient organization of capital be not destroyed.

Will More Than Fulfill All Promises

By WILLIAM P. PALMER, President of the American Steel & Wire Co., Cleveland, Ohio.

One hundred years from the opening of the Civil War the Southern States will show, in my opinion, that they have more than held their own in comparison with other sections. There will be a wide range of manufacturing in metals and textiles, giving a vast population employment. The banking facilities will have expanded and great wealth will come from the methods of intensive farming and diversification of crops.

The South will have absorbed a large part of the immigration and the south of Europe peoples will find congenial and profitable employment within her borders. She will not only sustain herself, but will have a surplus of everything for sale. One great help the South will appreciate will be the opportunity to secure the most up-to-date equipment possible. This may be in the shape of water-power, labor-saving machinery and many things developed through the process of elimination in more settled producing communities.

The South will have more than fulfilled all promises within the hundred years' period mentioned.

Increased Use of Basic Process Strengthens Position

By JOSEPH G. BUTLER, JR., Youngstown, Ohio, President Bessemer Ore Association, Youngstown, Ohio.

I believe the South has a great future, and the increased use of the basic process is going to be a very great help. Since 1908 there have been great strides made in the basic process, and I think all the South needs to round out its competition and make it effective is to increase the plants for consuming pig-iron at home; that is to say, put more of it into finished material.

Since my visit to Birmingham in the spring of 1908, the United States Steel Corporation has made vast expenditures, and I have no doubt will increase its finished productive capacity when the agitation, discussion, disturbance and misrepresentation now going on in Congress is over.

An Expert Boston View

By ALBERT L. SCOTT of Lockwood, Greene & Co., Boston.

Our company has been for over thirty years closely identified with one of the largest factors in Southern development, viz.: the textile industry. We have large investments in Southern mills, and many of our business friends and associates have investments in Southern mills and water-power enterprises. We have made these investments because we have felt that the South was peculiarly fitted by climate and location to become a great manufacturing section. We see no reason now to change the opinion which has been held by us and our predecessors in this business.

South's Future Depends on Manufacturing Expansion

By WILLIS L. KING, Vice-President Jones & Laughlin Steel Company, Pittsburgh.

The future growth of the South, in my opinion, will depend largely on its ability to increase its manufactures. The South has a foundation of wealth in its fertile soil and large crops, and the increment should be invested in various manufacturing lines. The question of an adequate protection in the tariff would be essential, and unfortunately the traditions of the South, in this respect, are not favorable, but the younger generation will bring about a change. A study of the manufacturing strength of the North must convince any man with an open mind.

The Next Ten Years to Far Surpass Last Ten

By JAMES A. BLAIR of Blair & Co., New York.

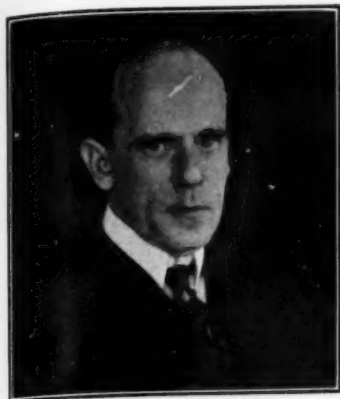
I think the future of the South is a very promising one and a good field for investment, as I believe the development in the next ten years will far exceed that of the last ten years, which has been very large, as anyone who is interested and will take the pains to investigate the statistics as to the same will find out. Its natural resources and geographical location are such as to demand the attention of those who are looking to the future for returns on investments they make in the South.

A Great Future as an Investment Field

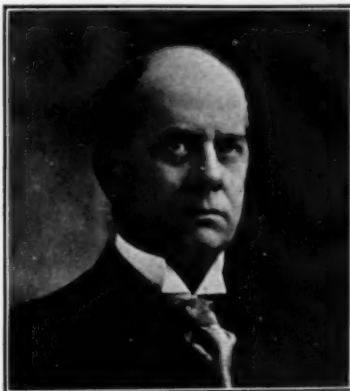
By E. A. S. CLARKE, President Lackawanna Steel Co., New York.

The South has, in my judgment, a great future as a field for investment and development, based on its natural resources, including its great mineral wealth. In fact, I am inclined to think, for anyone who is willing to go into it as a permanent investment the South offers as great possibilities during the next ten years as any section of our country.

Some of the Specialists Contributing to this Issue



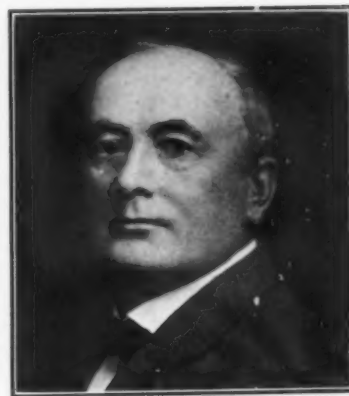
LOGAN WALLER PAGE.



EDWARD WHEELER PARKER.



DAVID T. DAY.



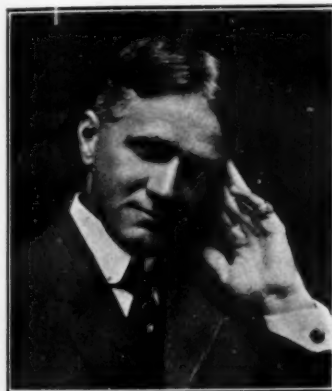
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B. F. YOAKUM.



JOHN JERMAIN PORTER.



C. G. MEMMINGER.



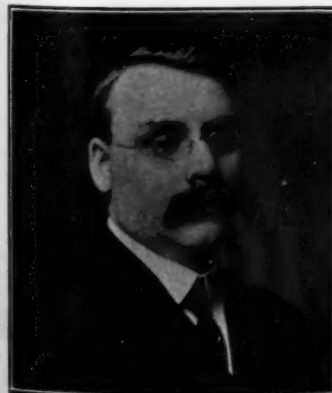
C. E. SIEBENTHAL.



CHARLES CATLETT.



ERNEST F. BURCHARD.



ANDREW M. SOULE.



JAMES C. LAWRENCE.



F. H. McMASTER.



FRANK L. HESS.

Future of the South

Clear Forecasts of its Advancement
in Various Material Domains
Enthusiastically Set Forth

BY

Experts in Manufacturing, Mineralogy, Forestry,
Agriculture, Highway Construction, Trans-
portation, Applied Chemical Science,
Reclamation and other Activities

Industrial Power in Southern Coal

By EDWARD WHEELER PARKER of the United States Geological Survey.

OF the sixteen Commonwealths included in the Southern States, twelve are, or have been, producers of coal. The total area underlain by coal in these twelve States, according to the estimates compiled by the United States Geological Survey, is 87,666 square miles, an area nearly 10,000 square miles larger than Maryland, Virginia and West Virginia combined. The quantity of the coal estimated to have been contained in the coal fields of the Southern States before their development began was approximately 532,500,000,000 short tons, and if this tonnage were contained in one bed six feet in thickness, it would cover an area of about 127,280 square miles, a territory larger than Virginia, North Carolina and South Carolina combined, and nearly one-half as large as the State of Texas. The total quantity of coal mined in the Southern States, to the close of 1910, has amounted to a little over 1,506,000,000 short tons, or about three-tenths of one per cent. of the original supply. If we accept the customary estimate of one-half a ton of coal lost for every ton recovered, the total draft upon the original supply has been equivalent to about 2,255,000,000 tons, or something more than four-tenths of one per cent. of the supply. It appears from this that notwithstanding the notable development in the mining and manufacturing industries of the Southern States since the close of the Civil War, more than 99.5 per cent. of the coal supply is still available. Coal production in the United States reached its highest record in 1910 with a total of 501,500,000 short tons. Of this quantity, the Southern States contributed 120,856,340 short tons, or 23.5 per cent. In 1880, thirty years ago, they produced 7,001,904 short tons out of a total of 71,481,570 tons, the percentage being less than 10. During the last thirty years the Southern States have produced 1,400,567,285 tons of coal, and in their entire history to the close of 1880 they had produced a little over 105,000,000 tons, 40 per cent. of which came from Maryland.

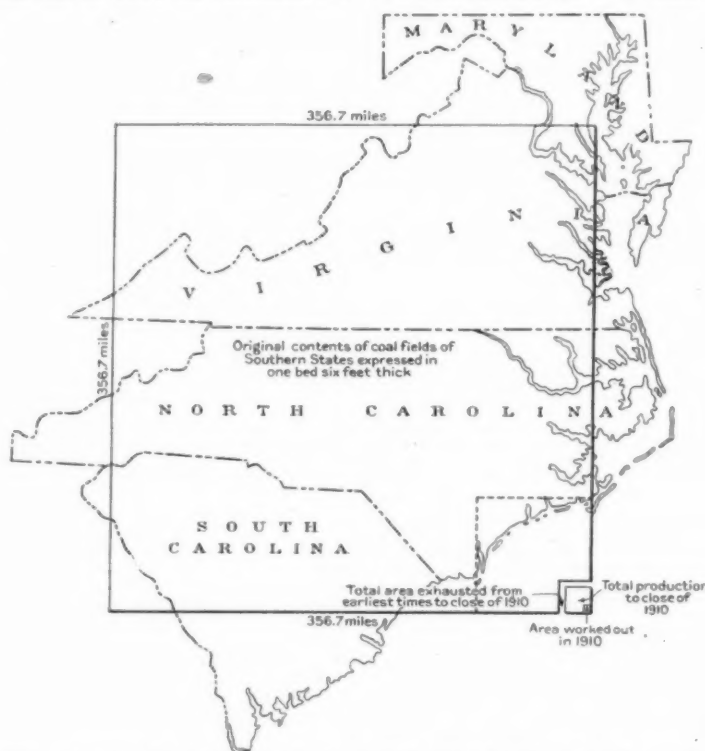
In order that some comprehension may be had of the extent to which the coal reserves of the Southern States have been drawn upon, and the relation that the present rate of production bears to the supply, I have prepared the accompanying illustration in which all of the coal beds are assumed to be gathered into one and spread out in a square. This square would be 356.7 miles on each side. The area worked out in 1910, that is, the production plus the necessary loss, is 6.5 miles square. The total production from the earliest times to the close of 1910 has left a space 19 miles square (361 square miles), and this production plus mining loss has exhausted the coal from 539 square miles. The quantity of coal still remaining in the square is approximately 530,000,000,000 short tons. If all of this were recoverable it would appear that the supply is equal to nearly 4500 times the production in 1910,

the twentieth century to be taken as an indication of what the Southern States are going to do during the remainder of the century? In the ten years from 1901 to 1910 the output amounted to 863,024,221 short tons, an increase over the preceding decade of 491,473,473 tons, or 132 per cent. If we can assume that in the next four decades the production will show increases of 100, 80, 60 and 50 per cent., respectively (and it does not appear that such an assumption is unreasonable), the second decade will show a total output of 1,725,000,000 tons; the third, 3,100,000,000 tons; the fourth, 5,000,000,000 tons, and the fifth, 7,500,000,000 tons. In other words, a conservative guess at the future indicates that the average annual production of coal in the Southern States during the ten years from 1931 to 1940 will equal the total production of the United States in its banner year, 1910. By the end of the first half of the century the total production of the Southern States will have amounted to nearly 19,000,000,000 tons, or considerably more than double the total output of the United States to the close of 1910. This would be equivalent to the

exhaustion, from a six-foot bed of coal, of 6665 square miles, which is indicated by the dotted lines on the diagram. It means, still allowing one-half a ton lost for every ton mined, a total exhaustion of 28,500,000,000 tons, or about 5.5 per cent. of the original supply.

Those who are pinning their faith in the future of the Southern States on the potential influence of their coal resources need have but one factor with which to give themselves concern. The rational conservation of this now abundant wealth rests not alone in minimizing the loss in mining and in securing the greatest possible recovery, but in what is of greater significance in the development of the section and the building up of desirable communities, namely, the utilization of these resources at home. The State, or the country, which exports its raw products for the benefit of manufacturing industries abroad is failing in its duty to its citizenship. The need of the South today is the means of utilizing a greater proportion of the wealth which it produces. Among the Southern States Alabama merits special commendation. It produced in 1910 16,111,462 short tons of coal, and the greater part of that was consumed within the State. Only a compara-

tively small percentage was shipped beyond the limits of the Southern States, and the most of that small percentage was sent to coast ports for bunker coal. The greater part of the output of Tennessee also is consumed within a comparatively restricted local territory. The production of the Southwestern States—Missouri, Kansas, Arkansas, Oklahoma and Texas—is consumed chiefly within that region. But when we consider the border States—Maryland, Virginia, West Virginia and Kentucky—we find a different situation. The larger part of the production of Maryland and Virginia is shipped to Baltimore and



COAL ACREAGE OF THE SOUTH COMPARED WITH AREA OF FOUR STATES.

COAL FIELDS OF THE SOUTHERN STATES, THEIR AREA, PRODUCTION AND ORIGINAL AND PRESENT SUPPLIES.

State.	Area.	Estimated original supply.	Production in 1910.	Total production to close of 1910.	Total exhaustion to close of 1910.	Estimated available supply.
Maryland	455	8,044,000,000	5,217,125	161,224,007	242,000,000	7,802,000,000
Virginia	1,900	22,500,000,000	6,507,997	72,748,408	109,000,000	22,391,000,000
West Virginia	17,000	150,000,000,000	61,671,019	589,616,621	880,000,000	149,120,000,000
North Carolina	60	200,000,000	.....	476,805	715,000	199,285,000
Georgia	167	933,000,000	177,245	8,776,959	13,000,000	920,000,000
Alabama	8,430	68,903,000,000	16,111,462	206,153,815	309,000,000	68,594,000,000
Kentucky	16,670	104,028,000,000	14,623,319	157,971,830	237,000,000	103,791,000,000
Tennessee	*4,400	25,665,000,000	7,121,380	103,983,797	156,000,000	25,509,000,000
Missouri	16,700	40,000,000,000	2,982,433	107,674,384	161,000,000	39,839,000,000
Arkansas	1,684	1,887,000,000	1,905,958	30,117,873	45,000,000	1,842,000,000
Oklahoma	10,000	79,278,000,000	2,646,226	48,558,734	73,000,000	79,205,000,000
Texas	10,200	31,000,000,000	1,892,176	20,056,941	30,000,000	30,970,000,000
Total	87,666	532,438,000,000	120,856,340	1,507,360,174	2,255,715,000	530,182,285,000

*Not including 1000 square miles in lignite fields.

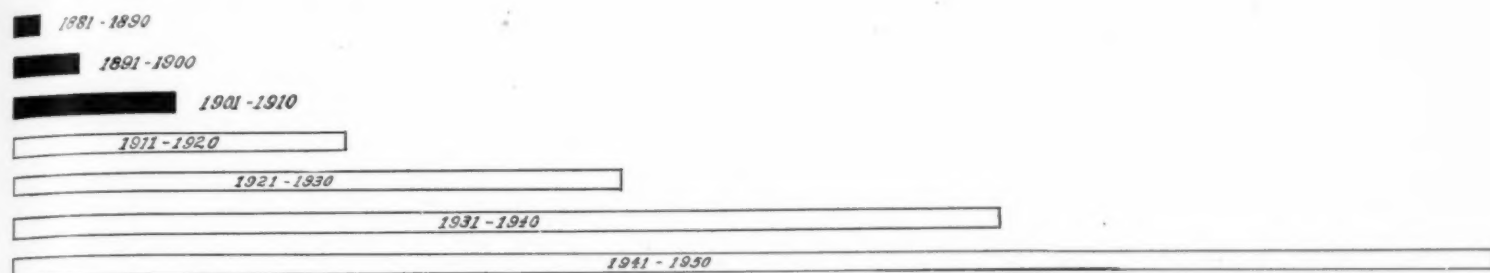
or if there be lost one-half a ton for every ton mined, the supply is 3000 times the exhaustion due to the production of 1910. This does not mean that the coal resources of the Southern States will last for 3000 years. True it is that at the rate of production in 1910 the supply would last for that length of time, or even longer, for as the beds approach exhaustion the production will decline gradually, but the rate of production has been increasing with startling rapidity, outstripping in this respect the other coal-producing regions. In the decade from 1881 to 1890 the Southern States produced 166,001,306 short tons, or over 50 per cent. more than they had produced up to the beginning of that decade. In the following decade, the last ten years of the nineteenth century, they produced 371,550,758 tons, a round hundred million tons more than their entire output up to 1890. Is the production of coal during the first decade of

Norfolk for reshipment to Northern ports. The railroad consumption in the transportation of the tonnage is no small factor. West Virginia ranks first among the coal-producing States of the South and second among all the States. More than 80 per cent. of the value of West Virginia's mineral production is in the value of its fuels—coal, petroleum and natural gas—and 80 per cent. of these is sent outside of the State. The production of coal in West Virginia in 1910 was over 60,000,000 tons, and of this enormous output, more than that of all the other Southern States put together, not more than 10 per cent. was consumed within the State, exclusive of that used by the locomotives engaged in its transportation. Home consumption means better prices. For instance, the average price of Alabama coal, consumed at home, in 1910, was \$1.26 per short ton; that of Tennessee was \$1.11. The average price obtained by the

producers of West Virginia coal, some of it the highest grade of bituminous coal produced in the United States (or for that matter, in the world), was 92 cents. It has been stated that Cuban iron ores of high grade can be laid down at Clarksburg, at Charleston, or at Huntington at no greater (probably lower) cost than Lake Superior ores can be delivered at Pittsburgh. West Virginia awaits only the hand that will bring the iron ores and her fuels together within her borders, to make her in manufacturing, as she is in coal-mining, one of the leading Commonwealths.

A large part of Kentucky's coal is also shipped out of the State, though not in such proportion as in West Virginia. The eastern part of the State has

industrial development began which, in its progress, has not been equaled anywhere in the world. This has been due, as is well known, to the contiguity of the iron ores, the coals and the limestones, and in the vicinity of Birmingham pig iron can be made more cheaply than elsewhere in the United States. But iron and Birmingham represent only a part of the South's industrial progress. Cotton mills have sprung up in every section. Cement factories, chemical works, quarrying, clay-working industries have followed, and always will follow. Once started, manufacturing industries have increased almost in geometrical progression. Some of them use water-power; in Louisiana, Arkansas, Oklahoma and Texas oil is an important source of power; most of the



PRODUCTION OF COAL IN THE SOUTH BY DECADES, 1881 TO 1910, AND POSSIBLE DECENNIAL PRODUCTION TO THE CLOSE OF 1950.

been the scene of unusual activity in railroad building during the last two years. The added transportation facilities are to afford output for extensive developments of new and rich coal fields in Pike, Harlan and adjoining counties, and should offer exceptional inducements for manufacturing enterprises in the Ohio Valley.

The diagram on the preceding page shows how generously Nature has distributed her bounties in the coal fields of the South. A study of them and of the table showing the quantities of coal still available will convince the most skeptical that the marvelous record of the last thirty years is but the dawn. What will this day of fifty, a hundred, or a thousand years bring forth? In 1880 the area contained within the Southern States was an agricultural region, and except in Baltimore, and for comparatively insignificant industries in some of the more Southern cities, manufacturing had made little progress, as the output of 7,000,000 tons in a population of 18,360,716 persons bears witness. In 1883 the boom in Birmingham began, and while the too highly inflated balloon burst, there was more of a foundation for the boom than usually obtains, and after the wreckage had been cleared away a safe, sane, conservative

power and practically all of the heat, however, save that of the sun, comes from coal. In 1880, when the South depended almost entirely upon agriculture, the per capita production of coal was 0.38 short ton; in 1910 it was 3.6 tons. The production of the Southern States in 1910 was equal to the total production of bituminous coal in the United States in 1896, only fifteen years before. By 1930, twenty years hence, if the record of the recent past is only approximately maintained, the South will be producing as much bituminous coal as the entire country is today, and if all of this output were consumed at home, the same would be true in regard to manufactures. Fully 50 per cent. of the South's coal, however, is being shipped away for the support of competing industries in other States, so that while its per capita production is 3.6 tons, its per capita consumption is but 1.8 tons, as compared with 5.5 tons for the whole United States. The South's richest treasure-house is its store of unmined coal, but great as that wealth is, it is unreplenishable, and once exhausted can never be replaced. It should be utilized primarily for the benefit of the Southern States. The national utilization of the South's supplies of fuel will make a New York of Norfolk, a Pittsburgh of Birmingham, an Essen of Chattanooga, and the whole South a land of plenty.

The Progress in Chemical Industry of the South

By DR. DAVID T. DAY of the United States Geological Survey.



ROMINENT among the characteristics of the Southern States as effecting the development of chemical industries are certain geologic features. These must not be lost sight of in any attempt to trace chemical development in the last thirty years and to forecast the progress of the next thirty.

The greater part of the region under consideration forms part of regions known as the coastal plain and the Mississippi embayment.

From the "fall line" on the eastern and southern edge of the Piedmont plateau to the ocean this coastal plain swings around the southern end of Georgia, till it is met by the fine silt of the Mississippi River, or the Mississippi embayment, which stretches as far north as Cairo and west to Little Rock. Farther west the tertiary formations of the coastal plain reach as far as Austin, Tex. The whole region is characterized by a light, sandy soil, here and there changing to sandy clays, but all exceedingly easily cultivated, and so very porous that the soluble ingredients are easily extracted by plant roots, and, conversely, are easily leached of their fertilizing matter. The result is a light, kindly soil that will yield abundantly until worn out. Much more quickly than the heavy western loams they require a renewal of their fertility by artificial fertilizers. Another item which has contributed to the need of fertilizers is the conservative habit brought with them from across the sea by the planters of planting the same crops on the same ground year after year, and thus hastening the exhaustion of the soil.

Phosphoric acid, potash and nitrogen have thus become necessary. Geology has again proved a determining cause in Southern chemical development, for near Charleston, S. C., just where absolutely necessary to agriculture, the first great stores of phosphate rock were found. This was after the use of guano from the West Indies had shown what phosphates can do for agriculture. This Charleston phosphate rock must be ground and then rendered soluble in treatment with sulphuric acid. Therefore, at an early day fertilizer works became an industrial feature of Charleston. Sulphuric acid was either made from cheap Sicilian sulphur or imported from Baltimore, Philadelphia and New York, where the petroleum refining industry required large amounts of strong acid (oil of vitriol) and left as a by-product weak acid, but suitable for decomposing phosphate rock. Years of patient study were required to thoroughly build up this industry, first by determining the exact needs of the soil for phosphoric acid, and then fixing the most economic methods of treating the phosphate rock to yield a suitable product. It was manifestly impossible to accomplish all this and educate the farmer in the use of superphosphates and keep pace with the amount of phosphate rock offered to the ferti-

lizer factories; therefore, much phosphate was exported in the raw state. This export trade increased rapidly with the discoveries of phosphates of high grade in Florida. With the appearance of this new supply the fertilizer industry itself expanded to Savannah, Atlanta and many other localities, and the industry was still further developed with the discovery of rich phosphates south of Nashville, in Tennessee.

Two other mineral supplies have greatly aided this development—the mining of pyrite from under the gossan iron ores of Louisa County, Virginia, and the great sulphur mines of Southern Louisiana, of which more will be written further on. The latest powerful aid to the fertilizer industry has been the legislation in Tennessee compelling the utilization of the sulphur fumes arising from smelting sulphide copper ores at Ducktown. This has lowered the price of sulphuric acid to all that part of the South, and has proved of value in developing all chemical industries into which that acid enters.

Obviously the preparation of artificial fertilizers has required other substances than phosphoric acid. Unfortunately, the supplies of potash have been obtained from abroad.

This supply of German potash salts, which is so much a matter of present interest, has done great service to the cotton crop, but the cheapness of this foreign supply has also done harm by dulling the edge of domestic enterprise. Without for a moment preaching political theory, who would not welcome a domestic supply of potash from feldspar, rather than be obliged, as we are, to deal with a monopoly in Germany, one powerful element of which is the German Government itself? As to the feasibility of this project of extracting potash from feldspar there are many opinions—and as many patented processes. But in the opinion of the writer several of these, especially that of Spencer and Eckel, the Thompson or Bassett patent, and the work of Dr. Cushman, make it a fairly sure proposition that potash from this source will soon compete with Germany and furnish this fertilizer ingredient at significantly lower prices, and the present agitation with its quickly fruitful results shows what might have been decades ago if the demand for a new supply had stimulated the chemists.

As to the supply of nitrogen, this has been of untold benefit in creating a demand for waste animal products of all kinds, such as dried blood, meat scrap and other refuse. Now there enters the new process of fixing the nitrogen of the air in the form of nitro lime, by passing sparks, or what might be called an electric flame, through a column of air and producing nitric and nitrous acids. A chemical factory is now in course of erection near the Seaboard Railway line in South Carolina, near Falls, and promises to be in opera-

tion by the time that section will be visited by the Eighth International Congress of Applied Chemistry next fall. Doubtless the rapidity with which this process has been adopted in the South may be justly attributed to the publicity given to it by the Manufacturers Record. Let us hope that this great congress will be able by next fall to see potash from feldspar, phosphates decomposed by our own Louisiana sulphuric acid and nitric acid from the air—all the essential elements of fertilizers, all produced at home by these most modern methods.

Without any intention of giving the exact historical order of chemical development in the South, it is evident that the chemical work necessary for fertilizers has outranked all others thus far.

The product of fertilizers in 1905 was worth \$36,041,076, according to the United States Census report. The spread of chemical fertilizers is shown by the fact that there were 234 factories in the South in 1900 and 256 in 1905. They were distributed as follows: Alabama, 21; District of Columbia, 4; Florida, 8; Georgia, 57; Kentucky, 6; Louisiana, 4; Maryland, 41; Mississippi, 5; Missouri, 7; North Carolina, 28; South Carolina, 20; Tennessee, 12; Texas, 4; Virginia, 39; West Virginia, 2.

In all, the South produced 2,440,510 tons of manufactured fertilizers, or over two-thirds of the production of the entire United States. It was worth over \$36,000,000. The industry represents over \$50,000,000 of capital invested in plant; it employed over 10,000 persons in labor, representing far more than average skill. But more than this, it gave a market for many raw materials, including fish scrap, bones, tankage, cottonseed meal, salt, limestone, phosphate rock, pyrite, sulphur, potash salt, nitrate of soda, wood ashes, sulphate of ammonia, etc. As to the last mentioned, Alabama and West Virginia produced about one-third of what the South itself used.

The production of nearly all these raw materials constituted additional industries in the South. Many were by-products essential for the profitable conduct of other industries.

As tributary to the manufacture of the fertilizers there are 71 sulphuric acid plants in the South, 21 of which are modern "contact" plants. But it should be pointed out that there is no production of nitric acid or of mixed acids, and there is only one muriatic acid factory. There is opportunity for the manufacture of acetic, boric, chromic, lactic, citric, tartaric, oxalic, salicylic, tannic and other acids, all produced commercially in other parts of the country.

Of the other chemicals produced in the South, explosives rank next to fertilizers. They include gunpowder, blasting powder, nitroglycerin, dynamite, gun cotton and smokeless powder, etc. There were 21 plants in the South in 1905, according to the report of Prof. C. E. Munroe in the report of the Census Bureau. They were distributed as follows: Alabama, 3; Kentucky, 1; Maryland, 2; Missouri, 4; Tennessee, 3, and West Virginia, 8. The total value of products was \$3,000,000, or about 10 per cent. of the country's product.

In paints and varnishes the South produces a total value of \$3,388,190, or slightly over 3 per cent. Of dyestuffs and tanning materials, \$2,500,000.

Virginia, Maryland and Missouri produce soda products. The Mathieson Alkali Co. at Saltville, Va., is a Southern pioneer in the soda industry. Georgia and North and South Carolina rank well up in the list of States where wood distillation products are made. These products include wood alcohol, wood vinegar, spirits of turpentine, tar, tar oil and charcoal. Of general chemicals the South produced only \$1,250,000 worth.

So much as to the actual chemical industries of the present day. It is time that in nearly every line the products, small as they are in percentage of the whole country, show generally such a creditable advance beyond the statistics of 1900 as to emphasize what this rich mineral region is capable of in the future.

There are two points of view in considering the chemical development which may reasonably be expected. First, there are the chemical products needed and used in the South, but purchased elsewhere. While as a general principle it would be wise to produce all these chemicals at home, there are doubtless cases where a foreign supply may be obtainable at much less cost. Certainly, however, certain classes of chemicals should be produced in the South at least to the full limit of the Southern demand. These include products coming from Southern minerals, shipped frequently long distances away from home to be manufactured and transported back to the South for consumption. Equally obvious are the cases where the proximity of various raw materials admit of a product cheaper than anywhere else.

Attention cannot too often be called to the most prominent case of the latter kind: the production of soda salts. Everyone is familiar with the vast beds of pure rock salt in Southern Louisiana, as well as the brines accompanying oil and gas to the north. In close proximity to this is found the cheapest sulphur production in the world—at the sulphur mines of Calcasieu parish, in Louisiana. With abundant cheap fuel, oil, gas and wood, with transportation in all directions by rail and water, no one can dispute the South's claim to supremacy as to location, but the nearest present supply of soda products is at Saltville, Va. The only problem in regard to this proposition which needs to be solved is as to whether soda products can be made more cheaply by the aid of sulphur acid, or whether the newer electrolytic method of decomposing salt should be used. The answer seems to call for both processes, because the by-products of both are useful in different ways.

No doubt the cheap fuel in the form of fuel oil, if properly burned in the new shapes of internal combustion engines, or cheap natural gas, will yield power sufficiently cheap to generate large units of electricity with which salt can be decomposed into caustic soda and chlorine so efficiently as to put these articles on the market at a lower price than anywhere else in the United States, and so far as the production of caustic potash is concerned this process will undoubtedly prevail. But under the term "soda" there are included a host of other substances, such as white alkali, refined alkali, salt soda, soda crystals, washing soda, crystallized sodium carbonate, bicarbonate soda, including bread soda, saleratus, sodium bicarbonate, sodium hydrogen carbonate, salt cake or anhydrous sodium sulphate, and all these can be pre-

pared efficiently by the old Le Blanc process, or by the newer ammonia soda process. At present Virginia and Maryland are the only States producing any of these compounds, and there is only one factory in each of these States.

Another line of chemical activity which could justly be pre-empted by the South is the working up of the Arkansas bauxite with the aid of the cheap natural gas in the Caddo (La.) field. I have already called attention to the low price at which electricity can be generated in the neighborhood of Shreveport and to the folly of transporting bauxite hundreds of miles to the north, to be there converted into aluminum, alum and other products, many of which are then retransported to the South.

The manufacture of aluminum has been reduced to a comparatively simple process in the course of the last ten years, and if electricity in large units is first assured to the present manufacturers of this material, there should be no difficulty in inducing them to locate a plant in the South. It should be noted as a minor detail in this process the fluor spar deposits in Kentucky will be available. The production of alum and sulphate of alumina simply means the bringing together of sulphuric acid made from the sulphur of Southern Louisiana and the bauxite of Arkansas, and any of the known sources of potash or soda if an alum is to be the result. Over 100,000 tons of alum are manufactured in the United States each year, but none of it in the South. For this purpose 50,000 tons of bauxite, 4000 tons of sulphate of soda, 10,000 tons of soda ash, 179,000 tons of sulphate of ammonia, 1000 tons of sulphate of potassium and 80,000 tons of sulphuric acid were consumed.

The making available for industrial purposes of a large supply of electricity is needed not only for the manufacture of aluminum and for caustic soda as alluded to above, but is the necessary feature in the production of bromine, graphite, lead, phosphorus, silicon, metallic sodium, ferrochrome, ferromanganese, ferrosilicon, metallic titanium, titanium pig-iron, tungsten and vanadium compositions among alloys; and adamite (fused corundum), alundum (artificial corundum), barium hydroxide, calcium carbide, carbon disulphide (bisulphide), carborundum (silicon carbide), hydrochloric acid, litharge and other lead oxides, potassium chlorate (chlorate of potash), potassium hydroxide (caustic potash), siloxicon and white lead.

More important still are a number of new oxidizing substances, peroxides of calcium, strontium and zinc and perborates of these same metals. Lest it should be assumed that too much stress is laid upon the production of chemicals in the far South, attention should be called to the supply of coal tar oils available as by-products in the manufacture of coke in such iron centers as Birmingham. Thus far these have not been used in the manufacture of coal tar dyes, in which hundreds of varieties should be necessary in the dyeing of the cotton goods already manufactured in the South.

Another class of compounds, the use of which is rapidly increasing throughout the South, is that of cyanides—potassium cyanide, sodium cyanide and the so-called "cyan-salt," which is a mixture of potassium and sodium cyanides; and also potassium ferricyanide (yellow prussiate of potash), potassium ferricyanide (red prussiate of potash); the corresponding cyanates, ammonium and potassium sulphocyanates, and the cyanamides.

The cyanides enumerated above are not only used to a large extent in the extraction of precious metals from their ores, but they are also used in the textile industry. As to the cyanamides, these are one of the type of the new fertilizers obtained by the action of nitrogen from the air on carbides. These, together with nitrolime, obtained by the action of electric sparks passed through air and the resulting nitric fumes passed through water, represent products of the greatest fertilizing value, as caustic nitrate of sodium, imported from South America.

The products of wood distillation are already well known in the South. There is, however, much opportunity for increasing the production of these products for the creosoting of timber.

Another class of materials which should be produced are known as plastics. These include celluloid, xylonite, fiberloid, viscoloid, pegamoid, pyralin and various products made from them. Included also are soluble cotton and the collodion or photographic films, artificial leather and the products made from it. Viscose and its products, rubber substitutes, and all other plastics formed from gutta percha, fibrin, gluten, and glue or other cementing material by which sawdust, wood pulp, zinc oxide, antimony sulphide, kaolin and other fibers are held in solid aggregations, which may be molded or shaped with lathes and other tools. The value of these products each year in the United States is about \$5,000,000, and will obviously give market to many otherwise valueless materials. Simply to enumerate other chemicals which should be manufactured, there are essential oils, compressed and liquified gases—acetylene, coal gas, hydrogen, sulphur dioxide, etc. In addition, there are various alkaloids, camphor, chloroform, ferro ethers, fusel oils, iodides, fruit extracts, and a host of chemical preparations from them, such as pepsin from the waste of the cattle industry. These are mentioned because of the undoubted fact that every chemical produced in the South becomes more or less an agent for the production of others. In other words, each step taken in the development of these chemicals makes possible the manufacture of some new product, the list of which could be extended much further, but it must be evident from what has been written that the growth of the chemical industry of the South justifies the statement that also many of the substitutes enumerated above will be features of the chemical industry of the South within the next few years.

In fixing in the minds of the readers of this article the importance of the development of the treatment of raw materials in the South, I would call to mind the forceful utterances of Dr. Booker Washington in his address at the opening of the Cotton States and International Exposition at Atlanta, where he recalled the instance of a foreign ship returning for water in the mouth of the Amazon, and in reply to signals of distress received the signal from the shore, "Cast down your buckets where you are."

Surely, this counsel may be well applied as the watchword for the development of the raw material of the South to a comparatively high state of manufactured products.

The Future of the South in the Manufacture of Iron and Steel

By JOHN JERMAIN PORTER of the University of Cincinnati.



THE iron industry of the South has been in the past of great importance, and has had a far-reaching influence on the industrial development not only of the South, but of the whole nation. Its future, as viewed from a proper vantage-point and looking beyond the clouds of the present depression, appears particularly bright, and as it rests upon great natural resources of ore and fuel, it is proper to start with a review of these materials.

The iron-ore resources of this section fall under two heads—first, the ores found in the South, and, second, ores outside of, but available to the South. The ores found in the South are of the following general classes:

- The Clinton red hematites of Alabama, Tennessee, Georgia and Virginia.
- The brown hematites of the Southern Appalachians.
- The specular hematites of the Southern Appalachians.
- The magnetites of the Southern Appalachians.
- The brown hematites of West Tennessee and Kentucky.
- The brown hematites of Texas.
- The red and brown hematites of Missouri, Arkansas and Oklahoma.
- Miscellaneous scattered deposits.

The geographic distribution, geology and general characteristics of these ores have been so often described, and the information is so readily accessible in State geological survey reports and elsewhere, as to render it unnecessary to elaborate here. Certain points in regard to quantity available and quality, however, have been subject to such general misconception as to render further discussion advisable.

There are two great difficulties in the way of making close estimates of quantities of ore available. The first is the difficulty of deciding how much of the ore would be commercially available under present conditions or at any time in the future. The second is the general lack of exact geological data. The following estimate of Southern ores is compiled from the best data available at the present time, including that given in State and national geological survey and private reports, but at that is only an approximation, and must be accepted as such. The quantities given are not simply ore actually in sight, but that which may reasonably be expected to be shown up on detailed exploration.*

Class of ore.	Millions of Tons	
	Available under present conditions.	Not available now but which can probably be used within the next 50 years.
a. Clinton red hematites.....	750	1,200
b. Brown hematites of Southern Appalachians...	150	600
c. Specular hematites of Southern Appalachians...	30	100
d. Magnetic ores of Southern Appalachians.....	20	200
e. Brown hematites of Western Tennessee and Kentucky.....	100	200
f. Brown hematites of Texas.....	250	600
g. Hematites of Missouri, Arkansas and Oklahoma	100	300
h. Miscellaneous deposits.....	100	300
Totals.....	1,500	3,500

In addition to these tremendous resources, the South will be able, if necessary, to draw upon certain foreign ore deposits for the support of its iron industry. Vast quantities of ore have recently been discovered in Cuba and South America, and Cuban, Spanish and Swedish ores are being imported in large quantities to iron and steel plants in Maryland, New Jersey and Penn-

*As compared with this estimate the United States Geological Survey has estimated 853,000,000 tons now available and 1,806,000,000 tons not yet available, a total of 2,719,000,000 tons, while E. C. Eckel has estimated 2,605,000,000 tons of ore in the South east of the Mississippi River as available now or in the very near future, while he puts the total reserves of the South at about 10,000,000,000 tons. The estimate of the United States Geological Survey was made on an ultra-conservative basis, and much of the ore classed by them as not at present available could really be exploited at the present time should it be needed.

sylvania. Various Southern seaports situated along the Atlantic and Gulf coasts, within easy reach of the coal fields of Virginia, West Virginia and Alabama, would seem to offer attractive sites for iron plants smelting these foreign ores with domestic fuel, and it is highly probable that these ores may in this way have an important share in the future growth of the South.

Although at the present time the South produces only about 12 per cent. of the ore mined in this country, it seems certain that the future must bring an improvement in this respect. The Lake Superior regions are now supplying

some 80 per cent. of our total ore requirements, and while the resources of this region are very great the high-grade ore such as is now demanded is being rapidly exhausted. On account of the great distance of these fields from the fuel sources and smelting centers, the low-grade ores have much less value than corresponding ores in the South, and it is likely that the Southern ores must be relied upon to supply an increasingly larger proportion of the total requirements of the country.

The quality of the Southern ores is quite generally misunderstood, for though they do average low in grade the case against them is not nearly as bad as is generally made out. The two chief classes of ores are the Clinton red hematites and the brown hematites. Considering first the Clinton ores, which form the mainstay of the industry in Alabama, these ores contain typically a large quantity of carbonate of lime in addition to the iron and usual impurities. Carbonate of lime, however, must be added to the furnace in smelting as a flux, and if not present in the ore must be added separately as limestone. Hence, this substance is not to be regarded as a worthless impurity or as depreciating the value of the ore except as the value of limestone is less than the value of pure ore.

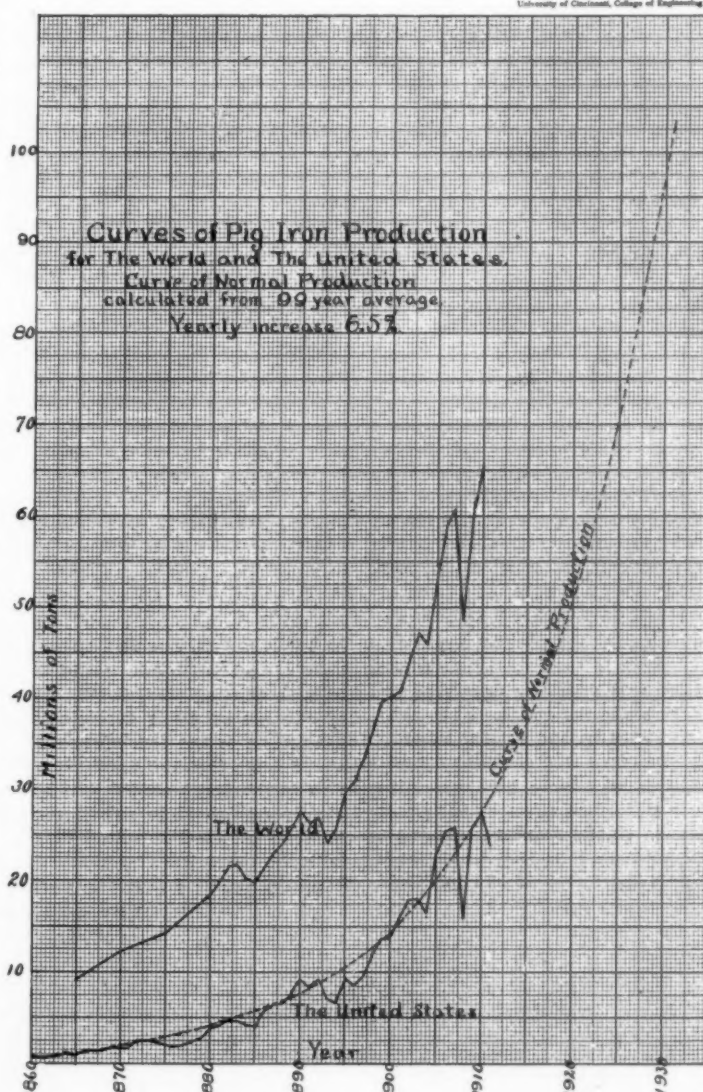
Again, in the case of the brown hematites an ore of this class containing 40 per cent. iron is not to be compared with a 40 per cent. Lake Superior ore. The latter will contain 35 per cent. or more of siliceous impurity, which adds to the cost of smelting, while the brown ore will contain only about 25 per cent. of such impurities, the difference being combined water, a perfectly harmless and unobjectionable constituent as far as smelting is concerned. Moreover, the brown hem-

atites are, as a rule, more readily reduced than most other classes of ore, so that in smelting less fuel is required than would ordinarily be the case.

Since the manufacture of iron and steel requires fuel as well as ore, the possession of vast reserves of coal enormously strengthens the South's present and future position in the iron industry. It is perhaps not generally recognized that the Southern States of Maryland, Virginia, West Virginia, Kentucky, Tennessee and Alabama possess about 75 per cent. of the total coking coal resources of the country, the only Northern State containing any important amount of coking coal being Pennsylvania. Moreover, the coking coal of this latter State is being very rapidly exhausted, the renowned Connellsville basin having an estimated life of only 25 years at the present rate of production. The Northern iron industry is even now dependent to a large degree upon Southern fuel drawn from the States of West Virginia, Virginia and Kentucky.

The South has for many years been the leader in the manufacture of foundry pig, and is at the present time the leading district in the production of this grade of iron. In the manufacture of pig-iron for other purposes, it has been in the past handicapped by the high phosphorus of its ores, but with the advent of steel-making processes in which phosphorus can be eliminated this objection is happily overcome.

Technically, the manufacture of pig-iron in the South is characterized by very high fuel consumption, due chiefly to the difficult reducibility of the Clinton red ores, which are so generally used, and to the large amount of slag made. The lowering of the fuel consumption is the most important technical problem now before the furnace men operating in the district, and much is being done in some quarters to reduce the waste through improved methods of washing coals and concentrating ores, the use of by-product coke ovens,



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etc. The dry blast process has not yet been adopted by any Southern companies, but there is every reason to believe that it would prove particularly advantageous to this district. It is worthy of note in this connection that the great technical advances now being made along the line of ore treatment, coking methods and blast furnace practice will be of greater benefit to the South than to any other section, provided only that capitalists and managers see the opportunities and make use of them.

The great disadvantage under which Southern iron manufacturers have always labored has been the lack of local markets for their product and the consequent necessity of shipping the bulk of it North at a freight rate of several dollars a ton. This handicap will continue as long as the South remains backward in working up its crude materials into finished forms, but it is noteworthy that conditions in this respect have materially improved within recent years, and there is reason to think that they will improve even more rapidly in the future. Among the more important factors working in this direction is the Warrior River project, which will in time allow Birmingham iron to reach New England and Atlantic Coast points by an all-water route, and presumably at a much lower freight rate; the completion of the Panama Canal in connection with the Warrior River will give access to the rapidly growing markets of the Pacific Coast; and finally the South itself is growing at a tremendous rate, and with the increase in population is coming an even greater increase in the market for all kinds of finished iron and steel products.

The great advantage of Southern iron-makers is the low cost of manufacture due to the proximity and low cost of assembly of the raw materials. There are certain plants in the Birmingham district which probably make the cheapest pig-iron in the world, but it must not be forgotten that these plants can be counted on the fingers of one hand, and that the majority of operators have no such sinecure. With better home markets the situation would be far more comfortable.

Political capital has been made of the widely advertised fact that in the nineties iron was made in Alabama for as little as \$6 per ton. Since that time, however, the whole tendency of costs has been upward, and at the same furnaces costs are now nearer \$9. Similar conditions prevail in other iron manufacturing districts, so that the South is relatively none the worse off.

Although much progress has been made in the past ten years, the great need of the South is still more finished products. This section, on the basis of population, should consume about 35 per cent. of the finished steel and castings used in this country, and probably does consume well over 25 per cent., or say 7,000,000 tons of steel and 1,500,000 tons of castings annually. Its output of pig-iron is not adequate to supply its own requirements of finished material, and yet probably one-half or more of this pig-iron is sent North to be converted into finished steel, castings and machines of all descriptions, a large part of which are then shipped back for sale, perhaps to the very producers of the raw material. The South thus not only loses the profits of this supplementary manufacture, but as a consumer pays a double freight rate on the final product.

In the manufacture of steel the South has been in the past handicapped to some extent by the nature of its ores, as the first processes developed required a low phosphorus ore, which is not available in the South. Now, however, high phosphorus ore can be used without difficulty, and steel is successfully made at Ensley, Gadsden and Atlanta. It is true that conversion costs are a little higher with the high phosphorus Southern basic iron than with the low phosphorus Northern irons, but this is more than offset by the lower costs of making iron. The South is now making chiefly standard rails, bars and wire products. It needs especially mills for light rails (for which there is a large market in the mining and lumbering industries), merchant pipe and tubing, sheets, plates and structural steel, as well as fabricating works and foundries.

In foundry lines we have some very successful plants now in operation. The South takes high rank in the manufacture of cast-iron water and soil pipe, for example, and there are many stove, car-wheel, machinery and general jobbing foundries successfully operating. Chattanooga may be particularly mentioned as a successful foundry center, not only supplying local trade, but shipping castings north of the Ohio River. There should be far more done, however. The South could and should supply stoves to the rest of the country, should build more general machinery and more agricultural machinery. Development along these lines will do more than any other thing to help the iron industry of this section, and conversely it may be said that the development of the iron and steel industry, more particularly as to semi-finished products, will do much towards building up general manufacturing.

In the future the foundry business of the South should profit particularly by a process of consolidation and integration involving a combination of the foundry with the blast furnace and the manufacture of castings direct from blast furnace metal. The various technical difficulties which have been present in the past have been overcome by recent advances in the state of the art, and the time is now ripe for the more general adoption of the process. The advantages to be gained are great, involving both decreased cost and increased quality, and since Southern conditions particularly favor this combination it is not improbable that it may prove an important factor in the future industrial development of the section.

It is natural that the present depression should cause anxiety concerning the future, but remembering past history we cannot doubt but that when the skies clear development will proceed with a rush that cannot fail to take up promptly all present capacity and cause much new construction. It has been many times pointed out that, in this country, demand for iron and steel is increasing at the rate of approximately 100 per cent. each decade. The accompanying diagram shows graphically the past, and what may be reasonably be expected in the near future, and gives some idea of the great development which the future holds in store.

A parallel inquiry is the future course of prices. A study of past history reveals a nearly uniform downward tendency from the earliest times to about

the middle of the late nineties. Since then the average trend has been slightly upward. The low prices reached at that time were due to a combination of a severe business depression, with very low costs made possible by cheap labor, and the development of the most easily won of the Lake Superior and Southern ores. At that time the cream was skimmed from the two greatest ore deposits of the country, and it seems impossible that such low costs can ever again be duplicated.

There is every indication that the present average upward trend of prices will continue for many years to come, for although new ore deposits may be discovered, they will hardly be located close to our coking coal fields, and the continuous progress in technology can hardly be expected to do more than partially offset the greater costs of assembly and leaner character of the ores to be smelted. Probably \$10 Birmingham is a fair approximation to the future minimum price of Southern pig-iron, and the normal or average price which can be expected during the next one or two decades is not far from \$13.

It is evident, therefore, that the future will see developments in the iron and steel industry far surpassing the performances of the past. The question is, what part is the South to have in this expansion?

In the past the South has had its share of failures, and investors who have been bitten are apt to discredit its possibilities. The Tennessee Coal, Iron & Railroad Co., for example, has been bitterly referred to as a "sink-hole for money." This, however, is inevitable; steel plants are not built for any small sum, and any iron enterprise based on large natural resources must, in order to utilize them, have a vast amount of capital sunk into it before any adequate return can be expected. The Gary plant of the Steel Corporation has cost to date over \$70,000,000, and note that this does not include any ore or coal property. The Tennessee company represents an investment of perhaps \$45,000,000, and this does include a full complement of operating mines, as well as vast reserves of ore and coal.

The truth of the matter is that Southern iron enterprises have suffered chronically from lack of capital. Lumping the failures together, probably 50 per cent. of their difficulties can be attributed directly to this lack, the balance being due to poor judgment and management, or lack of understanding of the peculiar conditions. In this connection it should be noted that owing to the variety and lack of uniformity of the raw materials, the management of an iron enterprise in the South presents more complex problems and calls for more technical skill than is the case in most other districts.

Statements have been made to the effect that Southern iron ores of a desirable character are practically monopolized by a leading interest. Nothing can be farther from the truth than this claim, the concern referred to actually holding not over 15 to 20 per cent. of the higher grade ores, and an even smaller proportion of the low-grade material, which will undoubtedly come into use some time in the future.

As a matter of fact, there is more desirable ore available to purchasers in the South than in any other section of the country. In other districts plenty of low-grade ore can still be purchased, but to get hold of any considerable body of high-grade ore it is in general necessary to do so by consolidation of or with existing companies. While this country stands in no danger of the ore famine so freely predicted some years ago, the more or less complete exhaustion of the rich ores is on the other hand quite imminent. Hence it would seem that the development of the large uncontrolled deposits of such ores in the South cannot long be postponed and that investors who are sufficiently farsighted to get an early start in this field will reap an abundant harvest, provided only that they have sufficient capital and patience to stay with the proposition.

In conclusion, I would call attention to certain Southern points which appear to offer particularly promising opportunities for the establishment or expansion of an iron industry.

The first of these is the Chattanooga district, which, in my estimation, offers one of the best, if not the best, opportunities for a steel plant to be found in this country. All of the conditions appear highly favorable. There is an ample supply of ore, low grade, it is true, with regard to iron content, but not when its other constituents are taken into consideration, and it can be mined at a reasonable cost per unit of iron. Fuel is close at hand and abundant, and can be obtained from several alternative fields, while all the points connected with markets, transportation facilities and the various minor factors are favorable.

A second point is the brown ore district of West Tennessee, these ores being at present smelted chiefly at Florence-Sheffield, Ala. This district undoubtedly possesses vastly more ore than published reports would indicate. Fuel must be brought from a greater distance, but this is to some extent offset by the easy smelting character of the ores. It is claimed, and probably with truth, that with a favorable combination iron can be made as cheaply here as by the average Birmingham furnace. Owing to the exceedingly high phosphorus of the ores, the market for the iron is more or less limited, but this would not prevent its use in the manufacture of basic open hearth steel, and it is possible that a basic bessemer plant could be successfully operated under these conditions.

The great brown ore fields of Texas have only recently begun to receive the attention which their importance deserves. Their location, remote from any coking coal, presents certain difficulties in their utilization, although not greater than in the case of the Lake Superior ores. At the present time it is proposed to ship these ores to Atlantic Coast points via water route, and there smelt them with coal from the Appalachian fields. This is doubtless the most feasible plan for their utilization, but in this connection it is probable that a minor industry can be established at Gulf ports in Texas, the fuel for smelting being brought back in the same boats in which the ore is shipped. The economy of thus carrying out the smelting at both ends of the water route is obvious, and it need hardly be stated that this locality is very well situated with regard to both local and export markets.

In Alabama, and more especially in the Birmingham district, the bulk of

the ore is in the hands of strong concerns, and there is small chance for any new concern to obtain a foothold unless by purchase and consolidation. The one important exception is to be found in the specular ores of Talladega county, frequently referred to as the gray hematites. There is a large available tonnage of these ores, while their quality compares favorably with the brown ores of the State. They are at present being held unutilized for a rise in value, but if not absorbed by some existing concern they will no doubt some day form the basis of an important new industry.

The use of Cuban and Texas ores at Atlantic Coast points has already been mentioned, but I have not yet brought out the reasons why certain Southern ports offer the best possible points of assembly for these ores and the coal of the Appalachian fields. The cities of Norfolk, Newport News and Charleston have already received attention in this connection, and no doubt will be the sites of plants in the not far distant future. These cities are all terminals of important coal-carrying railroads, and the cost of assembling the raw materials should be appreciably less than at the points farther north, where these ores are at present being used. In addition to foreign ore supplies, these cities could also draw upon certain minor ore deposits of Virginia and North Carolina, more especially the magnetic ores, and there would also be available a

considerable amount of pyrites cinder, a by-product of the fertilizer works, and which on account of its high iron content is a valuable substitute for ore.

In this connection we may also note the possibility of reviving the declining iron industry of certain sections of Virginia by supplementing the falling supplies of brown ore by ore imported via Norfolk or Newport News. Since, owing to the movement of coal, the bulk of the freight traffic is now coastward, the railroads could well afford to make a very low rate on ore brought in from the coast, and there is a strong possibility that something may be worked out along this line.

Finally, there are in all probability some very good opportunities for the establishment of an iron industry in the States of Missouri and Oklahoma. The iron ore resources of these States have not received the attention of those in some other sections of the country, but there seems no doubt that there is a very considerable amount of ore available at several points. The main difficulty in its development is the lack of suitable fuel. These States, together with Arkansas, possess large resources of coal, but unfortunately it is not coking coal, and hence is not available for iron smelting. However, it is altogether probable that with careful study a combination could be worked out which would prove profitable.

Phosphate Mining in Relation to the Fertilizer Industry

By C. G. MEMMINGER, Consulting Mining Engineer, of Lakeland, Fla.



COMPARATIVELY limited number of persons—except those directly connected with the mining of phosphate or manufacture of fertilizers—have any correct conception of the importance and magnitude of the phosphate mining industry and the manufacture of fertilizers. The two industries are interdependent on each other, and in this article we will first take up phosphate mining, and later present a general review of the fertilizer industry in the South.

Phosphate is used by all fertilizer manufacturers in every part of the world as the source of supply from which is derived their phosphoric acid, this being one of the three absolute essentials to plant life growth. The valuable ingredient in phosphate rock is phosphoric acid, which is combined in the form of lime, as tricalcium phosphate, and is commercially termed "bone phosphate of lime," being exactly the same chemical formula as animal bone.

Phosphoric acid in phosphate rock in its crude form as mined is not available as plant food. In the manufacture of fertilizer it is necessary to grind the crude material into a fine powder, then treat same with sulphuric acid; by this process the insoluble tricalcium phosphate is converted into what is termed available phosphoric acid. Available phosphoric acid consists of water soluble and citric soluble, and in this form is readily assimilated as a plant food when applied to the soil.

SOURCES OF PHOSPHATE IN THE UNITED STATES.

The principal sources of phosphate in the United States are Florida, Tennessee and South Carolina, ranking in commercial importance as named above. During the last few years deposits of phosphate of immense tonnage and area have been shown to exist by reports of the United States Geological Survey in Wyoming, Idaho, Utah and Montana. These deposits, owing to their geographical location, are not at present available on account of high freight rates to points of consumption. Furthermore, they have been withdrawn by the United States Government from entry and therefore from development. These deposits, however, form a source from which future generations will draw their supply of phosphoric acid after the exhaustion of the Florida, Tennessee and South Carolina beds.

SOUTH CAROLINA PHOSPHATES.

South Carolina phosphates have been mined for the past forty-four years, but owing to the gradual exhaustion of the deposits, and in face of higher grade of the Florida and Tennessee product, the output at present does not amount to over 200,000 tons per annum, all of which is consumed locally.

TENNESSEE PHOSPHATES.

These deposits have apparently reached their maximum development, the output—within the past two years showing a slight decline—amounting at present to about 600,000 tons per annum. In 1899 162,531 tons of Tennessee rock was shipped abroad; this export business has, however, decreased materially, and a comparatively insignificant amount was shipped foreign during the current year. The high percentage of iron and alumina, and the long haul from mines to ports of shipment, are the causes for the decline in export of the Tennessee phosphate. The use of this phosphate is confined largely to factories located adjacent thereto.

FLORIDA PHOSPHATES.

These deposits represent the greatest tonnage of phosphate mined in the world, and are so located that fully two-thirds of the fertilizer business of the United States can be supplied from these sources at lower freight rates than from any other point. In addition thereto, these deposits, lying comparatively close to the Gulf seaports, are excellently located for foreign shipment.

Phosphate deposits in Florida are found in two forms. First, hard rock; second, Florida land pebble.

This class of phosphate occurs in the middle western portion of the peninsula, beginning at Albion on the north, and extending to Bay City in the south, an approximate distance of 100 miles long by 25 miles wide.

Hard rock deposits occur in pockets of varying tonnage and grade scattered through this territory. The rock is of very high grade, and is sold on guarantee of 77 per cent. bone phosphate of lime, minimum, and 3 per cent. iron and alumina, maximum. On account of the high grade, all of the Florida hard rock phosphate, with the exception of a small amount used in chemical manufacture, is exported abroad. Hard rock occurs in more or less pockety deposits, and the cost of mining therefore is considerably higher than the pebble phosphate.

The mining of hard rock in its incipency represented a number of problems to be overcome in the mining and preparation of the product for market. These difficulties were gradually surmounted, and while the individual plants are small, they represent an efficient type and are thoroughly adapted to the work in hand. Owing to the uncertain and pockety nature of the deposits the cost of mining varies within wide degrees. Hard rock reached its maximum in the years 1907 and 1908, with approximate shipments of 700,000 tons annually; from that time there has been a steady decline, shipments in 1910 being 480,098 tons. The decline has been due largely to the low price of phosphate and increased cost of mining deposits, as naturally the most available and easily mined deposits were opened up in the incipency of the business. The high-grade Ocean Island and Christmas Island deposits have caused active competition in the European market, and have been serious competitors for the hard rock Florida mines.

In the early days there were hundreds of individual miners, but these have gradually dropped out, and the mining is now confined practically to the following companies: Dunnellon Phosphate Co., Dutton Phosphate Co., Buttgenback & Company, Camp Phosphate Co., Cummer Phosphate Co., and Schilman & Bene. There are other minor companies, but these represent the chief operators.

The ports of shipment for hard rock phosphate are Jacksonville, Fla.; Fernandina, Fla., and Port Inglis, Fla. The mines of this section are served by the Atlantic Coast Line Railroad, the Seaboard Air Line Railway and by a road owned by the Dunnellon Phosphate Co., with terminals at Port Inglis.

This is by far the most important class of Florida phosphate. The Florida land pebble phosphate district is located in Polk, DeSoto and Hillsborough counties, and is embraced in a territory extending approximately 30 miles north and south by 25 miles east and west.

This phosphate occurs, as the name indicates, in the form of pebbles, of irregular shape, varying in size from minute particles to approximately an inch in diameter. The material is imbedded in a matrix of sand or sandy clay, lying in a horizontal stratum, varying in thickness from a few feet to in some instances 18 to 20 feet, and overlaid by overburden consisting of sand, sandy clay or conglomerate rock, from a few feet to 30 or 40 feet in depth.

The nature of these deposits is such that by careful prospecting the quality and quantity can be absolutely accurately determined. This is a very important feature, and one unusual in a mining proposition. The deposits, while not occurring in continuous beds over the entire district, do occur in deposits running in individual size up to several million tons. This being the case, the exploitation and mining of same can be undertaken on a large scale. The large tonnage of the deposits warrants the investment of large capital for the most thorough and up-to-date mining plants.

The mining of pebble phosphate represents a very unique feature, wherein what is termed the hydraulic method, which was so largely used in mining gold in California has been found the most feasible and economical method of handling the product. Water for the hydraulic streams is obtained by sinking artesian wells and raising water therefrom with air compressors. The overburden lying over the deposits is first removed, either by hydraulics or by means of steam shovels, as the nature of the case indicates. Mining is

then accomplished by means of water projected against the beds through giant nozzles and under high pressure furnished by powerful pumps. The stream of water disintegrates the beds of phosphate, cutting down and mining the material, and at the same time separating the pebble from the enclosing matrix. After the pebble has been washed down it is taken up by centrifugal dredging pumps, passed through a system of log washers and screens to eliminate clay and sand, and then conveyed to a central mill or drying plant, where the moisture is expelled by means of rotary dryers. The whole process is accomplished by machinery, the amount of hand labor being reduced to a minimum.

The mining plants installed in the pebble district represent the highest type of engineering skill, the most economical prime movers are used for generating electricity, which is largely employed in connection with the various mining operations.

There are two grades of land pebble phosphate. First, the medium or ordinary grade, running from 66 per cent. bone phosphate of lime to 70 per cent. This grade is sold under guarantee of 68 per cent. minimum bone phosphate of lime and 4 per cent. maximum iron and alumina. High-grade land pebble, running from 74 to 77 per cent., is sold under guarantee of absolute minimum 75 per cent. bone phosphate of lime, 3 per cent. maximum iron and alumina. At the present time practically all of the high-grade pebble is shipped abroad.

Shipments of land pebble phosphate are made from Tampa, Port Tampa and Boca Grande. Railroads serving the mines are the Atlantic Coast Line Railroad, the Seaboard Air Line Railway and the Charlotte Harbor & Northern Railroad, the latter terminus being at Boca Grande. Excellent loading and terminal facilities are afforded at all of these ports. All of the railroads are furnished with cars specially adapted for loading and discharging this class of material, so that every facility that could be desired is offered for rapid and economical shipment.

The following mining companies are at present operating in the pebble district:

Coronet Phosphate Co.
Prairie Pebble Phosphate Co. (International Agricultural Corporation.)
Florida Mining Co. (International Agricultural Corporation.)
Pierce Phosphate Co. (American Agricultural Chemical Co.)
Charleston Mining & Manufacturing Co. (Virginia-Carolina Chemical Co.)
Palmetto Phosphate Co.
State Phosphate Co. (Swift & Company.)
Armour & Company.
Florida Mining Corporation (F. S. Royster & Company.)
Standard Phosphate Co.
International Phosphate Co.
French Phosphate Co.
The Phosphate Mining Co.

The total combined output of the above mines is approximately 2,000,000 tons annually, and shipments during 1912 are estimated at this figure. In addition to the above companies, there is the plant of the Amalgamated Phosphate Co. now under construction.

The prime movers adopted for the electrical generation are steam turbines, producer gas engines and Diesel oil engines. Power plants are located at central points adjacent to the mill buildings and storage bins, and electric power distributed therefrom to the mining operations; by this method the most economical and efficient results are obtained.

It is estimated that the investment in land pebble plants and properties will run close to \$35,000,000.

Up to within a period of five years ago shipments of land pebble were equally divided between foreign and domestic consumption; but the increased consumption of fertilizer, especially in the Southern States, has caused a gradual reduction in the amount of pebble exported, so that during the current year not over 33 per cent. of this class of phosphate has been shipped to foreign countries.

The following statistics showing the increase in output and the consequent consumption of land pebble during the period 1900 to 1910 demonstrate that there has been an increase in the shipments of land pebble through Tampa and Port Tampa during this period of 696 per cent.

SHIPMENTS OF FLORIDA LAND PEBBLE PHOSPHATE, 1900-1910.

	Foreign.	Domestic.	Total.
1900.....	86,886	114,006	200,892
1901.....	113,777	159,817	273,594
1902.....	144,597	200,623	345,220
1903.....	152,961	157,015	309,976
1904.....	219,520	133,002	352,522
1905.....	238,668	165,317	404,985
1906.....	214,727	268,185	482,912
1907.....	296,918	267,784	564,702
1908.....	470,270	421,781	892,051
1909.....	509,341	419,701	1,329,102
1910.....	606,110	995,728	1,601,838

These figures do not represent the total increase, as in 1900 there was a very small amount of pebble shipped to interior points of consumption by rail. This interior business has developed tremendously, and it is estimated that not less than 600,000 tons were moved by rail from the pebble district to interior points of consumption. Through some inexplicable reason the railroads refuse to give the exact tonnage moved, or even an approximate tonnage, hence the figures of the interior consumption can only be arrived at in an approximate manner.

The following table shows the increase necessary in production of land

pebble phosphate, based on an annual increase in consumption of 10 per cent., during period of three decades:

Present annual production.....	2,000,000 tons
At end of first decade, with 10 per cent. annual increase, there would be an annual production of.....	4,715,895 tons
Or a total production for one decade.....	31,874,848 tons
With same rate of increase at end of second decade there would be an annual production of.....	12,231,817 tons
Or a total production for two decades.....	114,549,986 tons
With same rate of increase at end of third decade there would be an annual production of.....	31,726,183 tons
Or a total production during three decades.....	328,988,007 tons

FERTILIZER INDUSTRY IN THE SOUTH.

Competent authorities estimate the total capital invested in the United States in fertilizer factories to be between \$150,000,000 and \$175,000,000, of which about two-thirds is in the Southern States.*

Beginning in an incipient way, with the discovery of phosphate in the neighborhood of Charleston, S. C., about 44 years ago, fertilizer factories were erected shortly after the discovery of these deposits at Charleston and Baltimore. These two points became the center of the infant industry, which grew rapidly with the increasing demand. Charleston and Baltimore have maintained their ascendancy, and represent the two largest fertilizer manufacturing centers in the world at present.

The growth of the manufacture of fertilizer in the South has been phenomenal, as shown by statistics of tons sold given below from the Manufacturers Record under date of March 23, 1911:

	1910.	1901.
Virginia	346,555	200,000
North Carolina	619,915	285,578
South Carolina	721,500	293,000
Georgia	1,015,104	457,153
Florida	121,425	37,046
Alabama	401,692	191,583
Mississippi	131,526	66,173
Tennessee	55,900	40,043
Louisiana	87,900	47,883
Texas	34,300	10,500
Arkansas	27,000	15,000
Kentucky	45,000	40,000
Total	3,607,817	1,683,964

This shows the State of Georgia as the largest consumer, and as this State in many respects is in advance of any in the South, agriculturally and commercially, it is a clear indication that the use of fertilizers is in direct ratio with the growth and prosperity of a community.

The use of fertilizers in the Northern and Middle Western States has by no means made the rapid strides, and this industry has not gained such importance as in the Southern States; but with the gradual exhaustion of the rich lands in the Middle Western States the increase in consumption of fertilizers in the last few years has been very rapid and will unquestionably grow.

The ordinary layman fails to appreciate the vast importance of the fertilizer industry, and how essential same is to the well-being of the human race. Increase in population means increase in demand for food and plants grown for clothing purposes. The exhaustion of virgin lands therefore demands the return of the elements which have been taken therefrom by the crops. As population increases, intensive culture becomes a necessity, demanding therefore the use of fertilizer. We must replace the three essential elements of plant growth, phosphoric acid, nitrogen and potash, otherwise our crops decrease and our lands become sterile. No land is too poor, or no land becomes exhausted, if intelligent fertilization is resorted to. This is definitely proven by statistics in England, Belgium, Germany, Norway and Sweden, where there is a marked increase in production per acre of the various crops; whereas in the United States statistics indicate a marked decrease in production per acre in those States which fail to undertake scientific farming and the use of fertilizer.

Intensive farming tends in a large measure to reduce the amount of labor required in the cultivation of crops, and it is proven in the cotton State, where the average yield was approximately one-third of a bale per acre, with proper cultivation and fertilization, a bale or more per acre can be readily produced.

Owing to the excellent work of the agricultural colleges, the educational trains that are now sent out by the most advanced railroad lines, and the more liberal education of the younger farmers, the use of fertilizers is increasing rapidly. We have seen the wonderful results that have been obtained by high fertilization and intensive culture by the different boy corn clubs through the Southern States. Every Southern State appears to be awakening to the tremendous possibilities in raising of corn and other food crops by means of intensive fertilization and cultivation. The farmers of the Southern States are realizing that they are not dependent simply on cotton, but that they can meet in active competition any parts of the United States in the diversified farming to which their soil and climate are especially adapted.

The manufacture of fertilizer is apparently a very simple proposition—blending the phosphate rock with a certain amount of sulphuric acid and then an admixture of a proper percentage of potash or ammoniated material to supply the nitrogen, seems a comparatively easy process; but this is an error.

*Thanks are due to Mr. John D. Toll, editor of *The American Fertilizer*, for figures showing amount invested in fertilizer manufacture in the United States.

The manufacture of fertilizer should be combined with a thorough scientific study of the soil and crops on which same are to be used. In other words, the farmer and the fertilizer manufacturer should work in close accord, guided by thoroughly scientific study in each individual case of the fertilizer adapted specially to the soil and crop. In England, Germany, Norway and Sweden these conditions are carefully studied; the fertilizer is applied scientifically, and in this way maximum results are obtained; and it is only by the combined efforts of the consumer, the manufacturer and the scientist that these results will be obtained in our country. Our farmers are too prone to simply buy a ton of fertilizer without the proper knowledge of their special requirements, hence the maximum results are not obtained. All this can be readily obviated if the fertilizer manufacturers would use more scientific methods in producing their goods, and the farmer in purchasing them.

A most important point that should be noted is that in the foreign countries

fertilizer is sold on a unit basis, the farmer paying so much per unit, not so much per ton as in the United States. This is a very important feature, as the consumer thereby obtains not simply a ton of fertilizer, but just the elements that he requires.

Again, there is a strong tendency in foreign countries for the use of high-grade fertilizers, thereby reducing freight charges to the consumer. In this country a very large proportion of the material sold as fertilizer has no advantageous effect on the crop; by the use of high-grade concentrated fertilizer enormous sums in useless freight charges could be saved the agriculturist.

It has been stated by one of the most renowned scientists in the world that the commercial importance of a country was indicated by the amount of sulphuric acid produced; it can be held equally true that the prosperity and commercial importance of any country is in direct proportion to the amount of fertilizers that are applied to the soil.

Road Improvement in the South, Past and Present

By LOGAN WALLER PAGE, Director, Office of Public Roads, United States Department of Agriculture.

ROAD-BUILDING in the South is not a present innovation. The credit for the first road legislation in America, as well as the construction of the first road ever built by white men on our shores, belongs to Virginia. In 1632 the Virginia House of Burgesses provided that "Highways shall be laid out in such convenient places as are requested, according as the Governor and Council or the Commissioners for the Monthly Courts shall appoint, or according as the parishioners of every parish shall agree." But we are apt to be somewhat skeptical in believing that there was any very urgent need for roads at this period, when we recall that in 1625, when the British Crown took over Virginia from the London Company, the inventory reveals the interesting fact that the Governor alone possessed a horse. However, so far as can be ascertained, the first road built by white men in America was at Jamestown, soon after the passage of the Act of 1632.

The second earliest work of this character in the South was in Maryland. In March, 1643, Father Philip Fisher, a Jesuit missionary, wrote "A road by land through the forest has just been opened from Maryland to Virginia. This will make it but a two days' journey, and both countries can be united in one mission." But it is not until 1666 that we find in Maryland any legislation pertaining to the construction or maintenance of roads.

In 1662, or four years before the first Maryland Act, Virginia passed its third pretentious highway Act. This latter Act had for its object the construction and maintenance of passable highways throughout the settled regions. Surveyors were to be appointed whose duty was to establish a system of highways wherever needed in their districts as follows: First, a convenient road to the church; then roads to the courthouse and to Jamestown, and finally roads from county to county. The law required these roads to have a cleared width of 40 feet. The surveyors were assisted by laborers sent to them by the owners of adjacent estates. Upon the call of their vestries the estates were compelled to furnish as many persons for this purpose as they had tithables in their families. If the surveyor neglected his duties it devolved upon the County Court, after complaint had been duly entered, to instruct the clerk to communicate through the minister the fact to the church wardens and to command them to enforce the law. In certain instances private individuals were granted compensations for keeping the roads in repair. In 1670 an annual allowance of 1000 pounds of tobacco was granted to Mr. Thomas Hunt under an agreement whereby he bound himself "to maintain a good roadbed for highways, foot and cart over at the mill dam at Portan."

But we must not infer from this wealth of early legislation that the roads of these times were what we would today term good. In fact, the Maryland Assembly in 1704 found it necessary to provide that all roads leading to certain points were to be marked on both sides by specified notches cut in the trees bordering the roadway. Then, in order that the traveler might be able to distinguish between the different roads, it was provided that the marking notches should be different, so as to show whether a road led to a ferry, church, courthouse or some other point.

But even this wealth of precautions sometimes failed to clearly mark the way. We are told that as late as November, 1800, President John Adams and his wife Abigail, in driving overland to the capital, lost their way in the woods between Baltimore and the Potomac. We may also judge somewhat of the condition of these early roads from the contemporary postal service. In 1695, with the establishment of a mail route, letters were forwarded eight times a year from the Potomac to Philadelphia. In the Upper House Journal of Maryland we find the following entry under date of May 14, 1695: "Salary" of \$50 "to Mr. John Perry the post for carrying all public messages and Paquettes eight times a year betwixt Potomack and Philadelphia." By 1717 mail from Boston to Williamsburg, Va., was delivered every four weeks in summer and every eight weeks in winter.

South Carolina enacted its first road law in 1682, which provided for a board of commissioners and fixed a labor tax. But few roads were built in this State prior to 1730. Roads were built by the French in Alabama as early as 1702. These roads continued to serve as mail and stage lines long after the French control had ceased. In Georgia the first road was built in 1735.

The gravest fault with all these early efforts toward highway improvements was their extreme localization. The early settlers came largely from England, and it is no wonder that they adopted the customs then in vogue in their Mother Country. But this extreme localization of all highway work, construction, maintenance and administration has rested with terrific weight on the entire

South. Only of late years have we become conscious of the absolute need of centralization and co-operation in order to secure results. If the past 300 years has any lesson to teach, it is surely that extreme localization in the management of our public roads will never spell anything but failure. Success can only be achieved through centralization and united efforts. How well these great truths are being learned can best be seen from the comparison of a few statistics.

In 1904 a road census compiled by the Office of Public Roads showed that the aggregate length of public roads in continental United States was 2,151,570 miles, of which only 7.14 per cent. were improved. In the 16 States of the South there were 790,284 miles of public roads, of which only 29,851 miles, or 3.78 per cent., were improved. In 1909 the total mileage in the South was 830,721, of which 5.85 per cent. was improved. The average expenditure per mile in 1904 for the entire United States was \$37, while for the Southern States it was only \$31 per mile. Furthermore, it may be pointed out that in 1904 none of these States had established a State highway department, and, with the single exception of Maryland, none had even taken any definite steps looking in that direction. The administration of all road affairs was vested in independent local officials, who were without responsibility to any central authority for either their expenditures or their works. No less significant was the fact that 48 per cent. of the total sum expended in 1904 on the roads of the South was in statute labor. All these were handicaps, most of them inherited from past centuries, it is true, but not, therefore, any the less real handicaps.

It is evident that an extremely localized system of administration cannot produce the best results. Encumbered with a multiplicity of petty road officials, none of whom have any special training for the work nor sufficient authority to formulate or direct any definite road policy for even a limited district, we cannot even expect such a system to produce anything but chaos. To secure results we must have centralized authority with fixed responsibility. Years of study and a close observation of road systems, both at home and abroad, have convinced me that in general our unit of road administration should be the county, which should be supplemented with a State highway organization. The road affairs of each county should be placed in the hands of a competent engineer or superintendent skilled in road construction and maintenance. Nor should the tenure of this office be made dependent upon any political exigencies. It should depend only on efficiency and faithful performance of service. This official should have full authority to formulate plans and prosecute the work of improving and maintaining the highways, subject only to the governing body of the county and the regulations of the State highway department. The compensation should be sufficient to invite the best men to this work and justify them in devoting to it their entire time and best efforts. The system of statute labor, which still lingers in some States, should be abolished at once. No such form of labor has or ever will prove efficient.

But the South has done much since 1904. And I am glad to say that the general trend of legislation during the past few years has been along the lines of reform as outlined above. The indefensible lease system of convict labor has been largely superseded by what practically all our best penologists term the most humane and reformatory system yet devised, that of working our convicts on the public roads, both in preparing materials and in actual construction.

In some States much of the work of road improvement since 1904 has been done under special county acts, bearing but little semblance to each other. From what has been pointed out above, it will be readily understood that this is not the ideal to be sought, even though it has resulted in a great improvement over past methods. The ideal to be sought is a county unit system, supplemented by a State highway organization with the State, county and local community, each fairly sharing in the burden of construction and maintenance.

The fact that the road expenditures in the 16 Southern States reached the grand total of approximately \$46,225,000 during the past year is sufficient evidence of the work being done. Of this amount, \$12,894,000 was raised by bond issues. As an evidence of the substantial improvements made, it may be stated that 15 counties selected in the various States of the South have improved 3503 miles of sand-clay, gravel, macadam and shell roads since 1904, or an average of 233 miles per county.

In some counties provision for proper maintenance has gone to the extent of adopting a patrol system similar to that prevailing in France and many other European countries. An instance of the recent adoption of this system in the South is Granville county, North Carolina. Much of the same system is also

being practiced by Wayne county, Georgia, and Montgomery county, Alabama. It is to be earnestly hoped that in the near future the patrol system of maintenance will prevail over the entire South.

The accompanying table will illustrate more clearly than words what the South has done during the past year.

PUBLIC ROAD MILEAGE AND EXPENDITURES IN THE SOUTHERN STATES.

State.	Total mileage of all public roads.	Total mileage of improved roads, 1909.	Miles of road per sq. mile of area.	Population per mile of road.	Percentage of all roads improved, 1909.	Estimated Revenues and Expenditures, 1911.				
						State aid.	Local bond issues.*	Local revenues.	Total.	Per mile of public road.
Alabama.....	49,639	3,264	.96	43	6.53	\$154,000	\$2,330,000	\$1,000,000	\$3,484,000	\$70.19
Arkansas.....	36,445	1,085	.69	43	2.97	.....	.....	2,450,000	2,450,000	67.22
Florida.....	17,579	1,662	.32	43	9.97	.....	755,000	750,000	1,505,000	85.61
Georgia.....	82,230	5,978	1.39	32	7.27	.....	.....	2,500,000	2,500,000	30.40
Kentucky.....	53,744	10,115	1.34	43	18.82	.....	.....	2,500,000	2,500,000	46.52
Louisiana.....	24,692	329	.54	67	1.32	313,931	.....	1,052,926	1,366,857	80.40
Maryland.....	16,773	2,142	1.70	77	12.77	1,250,000	.....	1,000,000	2,250,000	134.14
Mississippi.....	39,619	342	.85	45	.86	.....	1,130,000	2,000,000	3,130,000	79.00
Missouri.....	107,923	4,755	1.57	30	4.40	300,000	.....	2,500,000	2,800,000	25.94
North Carolina.....	48,285	2,313	.90	46	4.79	5,000	2,500,000	2,000,000	4,505,000	93.30
Oklahoma.....	71,325	361	1.84	23	.50	5,000	.....	1,500,000	1,505,000	21.10
South Carolina.....	32,075	3,535	1.06	47	11.02	.....	100,000	1,000,000	1,100,000	34.29
Tennessee.....	45,913	5,353	1.10	47	11.66	.....	1,400,000	2,500,000	3,900,000	84.24
Texas.....	128,971	4,896	.49	30	3.80	.....	1,600,000	6,000,000	7,600,000	58.93
Virginia.....	43,399	1,903	1.08	47	4.38	300,000	2,454,000	1,250,000	4,004,000	92.26
West Virginia.....	32,109	591	1.30	38	1.84	.....	625,000	1,000,000	1,625,000	50.61
Total.....	830,721	48,624	1.10	39	5.85	\$2,327,931	\$12,894,000	\$31,002,926	\$46,224,857	\$55.64

*Bond issues definitely reported. Additional bond issues have been reported, but amounts not given.

It may not be amiss to examine the present status of road work a little more in detail. The States of Alabama, Georgia, Louisiana, Maryland, Missouri, North Carolina and Virginia have enacted laws whereby the State participates to some extent in highway work. In several of the States this participation is as yet but a beginning, and should be largely increased.

Alabama has but recently established a State Highway Commission, providing for the appointment of a State Highway Engineer and an annual appropriation of \$154,000 from the net proceeds of the convict labor fund.

Georgia gives no direct monetary assistance, but provides for the working of State as well as county convicts on the roads. This has proved a most satisfactory and profitable method for utilizing her prisoners. In 1904 the improved roads in Georgia amounted to only 1634 miles, or 2.85 per cent., but in 1909 the improved roads had increased to 5978 miles, or 7.27 per cent. of the total mileage, an increase in the improved roads of 265 per cent. in five years. Today Georgia has 4168 State and county convicts working on her public roads.

In 1910 the Louisiana Legislature created a Highway Commission, providing for the appointment of a State Highway Engineer and making a direct appropriation to aid the parishes in the improvement of their roads. Provision was also made for the use of State prisoners in road-building. To create a permanent highway fund an annual tax was levied of one-fourth of a mill on each dollar of taxable property in the State.

Maryland was the only State which had even the beginning of a Highway Department in 1904. In that year an act was passed providing for State aid, the State paying one-half and the county one-half. The sum of \$200,000 was appropriated for this purpose. Today Maryland has a splendid system of State roads built and maintained entirely by the State and a Highway Commission, which has supervision of the construction and maintenance of all State roads and also gives advice and assistance to the various counties. Up to the close of 1911 Maryland has appropriated approximately \$4,550,000 from the State treasury or by the sale of State bonds for the improvement of her public roads.

Missouri granted State aid to the various counties to the extent of \$300,000 during the past year. The office of State Highway Engineer was created by an act of the Missouri Legislature of 1907. The engineer is appointed by and is under the general supervision of the State Board of Agriculture, which has general supervision of road improvement in the way of devising plans and systems of improvements and advising county officials.

North Carolina makes no direct appropriation for road-building, but provision is made for working a portion of the State convicts on the roads and \$5000 is provided annually to be expended under the State Geologist in giving advice and engineering assistance to the counties of the State. In this case it can certainly be said that the principal has borne fruit a hundredfold. Not only have the people of North Carolina become thoroughly awake to the advantages of good roads, but the actual mileage of good roads has increased from 1259 in 1904 to 2313 in 1909, an increase of 84 per cent. The total percentage of improved roads in the State in 1904 was 2.5 per cent.; in 1909 it had reached 4.79 per cent.

Virginia makes provision for State and county convict labor on the public roads, as well as a direct annual appropriation from the treasury. During the past year \$300,000 was apportioned among the various counties and expended under the supervision of the State Highway Department. Many miles of splendid highways have been built in the last few years, until at the close of 1909 the improved roads in Virginia totaled over 1900 miles.

These are striking reforms to have been brought about since 1904. In the five-year period, 1904 to 1909, the mileage of improved roads has grown from 29,851 miles to 48,624 miles, or from 3.78 per cent. to 5.73 per cent. of the total mileage, an increase of practically 19,000 miles of improved roads in five years. Can we grasp what this really means? An improved road from Washington, D. C., to San Francisco seems like a tremendous undertaking, yet the mileage of roads improved in the 16 Southern States, 1904-1909 is equal to six such roads. And all this has been accomplished while these States are in what we may term the period of transition. What may we not expect in the next five years?

The South is now fully awake to the need of improved roads, and will no doubt in the future keep fully abreast with other sections of our country in this work. During the past year the total road expenditure of these 16 States was \$46,224,857, or considerably more than one-third of the total expenditure in the

United States, which is estimated at \$142,225,000. Local bond issues in the South amounted to \$12,894,000, while for all the United States local bond issues amounted to only \$18,503,000.

In the question of State aid, however, the South is far in the rear. The total amount of State aid during the past year was \$21,219,000, while the South aided

in road-building only to the extent of \$2,328,000, but one-ninth of the total State aid granted during the year.

These figures show something of what the South is doing and the expenditures being made. But to even estimate in a monetary sense the value of these improvements to the people is impossible. In a broad general sense they may be said to consist of:

First, making social intercourse and communication between farm and city less difficult, and thus breaking up the isolation of farm life, especially in the winter season. Second, increasing the productive area by making hitherto uncultivated lands accessible. Third, the substitution of more profitable crops and encouraging intensive farming. Fourth, increasing the land values. Fifth, reducing the cost of hauling.

Probably any one of these reasons would be sufficient to make the improvement of our highways a paying proposition. But when they are all taken together there is no longer any need for arguing the question whether or not it pays to improve our roads. Nor is there any argument for road improvement which does not apply to the South. In fact, many will apply to the South more strongly than any other section. The agricultural possibilities of the South are almost unlimited. But, in order that these resources may be developed adequately, the roads must be so improved as to be readily passable at all times of the year. Climatic conditions also make it especially desirable that the South have good roads. The precipitation is generally heavy during the winter months, which is also the period when it is desirable to do a great deal of hauling. Consequently, the old ungraded and uncared-for earth roads become almost, if not entirely, impassable.

Fortunately, the cost of improved roads in the South is in general much less than in the North. The road-building season is longer, and convict labor can, therefore, be utilized to better advantage than in the more rigorous climates of the North. Labor, which forms a large item in road construction, is also cheaper. Materials are in general abundant, while the sand-clay road, the peculiar blessing of the South, is well adapted to almost every State. Furthermore, maintenance costs are lower than in the North. But it must not, therefore, be inferred that provision for maintenance can be neglected. Maintenance is as important and vital in the South as in the North. But fortunately this necessary work can be done more cheaply in the South. Massachusetts, New York and New Jersey are finding that it costs from \$200 to \$300 per mile annually to maintain macadam roads subject to heavy automobile traffic, and while the maintenance costs of the South will increase with increasing automobile traffic, it is not likely that they will ever reach those of the North, where the climatic conditions are more rigorous and the price of labor higher.

The prevailing average cost per mile for building improved roads illustrates very clearly the advantages possessed by the South. Sand-clay roads are built in Georgia at an average cost of \$387 per mile, while the average cost in five States largely employing this method of construction is \$572. The average cost of gravel roads in Alabama is \$790 per mile, while for eight States the average is \$1725 per mile. The cost of macadam construction varies so largely in the different sections that it is difficult to fix a fair average cost. In Louisiana the cost of macadam construction is reported as low as \$1800 per mile, while in Maryland it is given as \$7660. A general average for nine States, including Maryland, is \$3826. In Massachusetts, on the other hand, we find the cost of gravel roads ranging from \$2000 to \$3500 per mile, and the average cost of macadam construction is about \$8000 per mile. In New York the average cost for macadam roads during 1908-1910 was slightly over \$9000 per mile. Thus in a general way we may say that the cost of good roads in the South is less than one-half of that in the North.

The South, with the exception of the Mississippi Delta region, is well supplied with road-building materials. The coastal plain, extending along the Atlantic and Gulf coast from Maryland to Old Mexico, and stretching inland from 50 to 200 miles in width, is in general well supplied with materials for sand-clay roads, excepting portions of Louisiana and Mississippi.

The Piedmont plateau, comprising the area lying between the Appalachian Mountains and the coastal plain, and extending as far south as Georgia, seems at first glance to be but poorly supplied with suitable materials. The rocks are, as a rule, schistose, but a closer examination reveals many smaller sections which have not been so highly metamorphosed and yield fair road material,

as sandstones, quartzites and granites. In certain localities numerous volcanic dikes yield trap or diabase of most excellent quality. The subsoil is in general a clay suitable for sand-clay construction, but sand is generally scarce, occurring as a rule in local deposits along the streams. Along the boundary line between the Piedmont plateau and the coastal plain gravel deposits of considerable importance occur.

In the Appalachian Valley, comprising the Coosa Valley of Alabama and Georgia and the Great Valley of East Tennessee and Virginia, chert and limestone of excellent quality are found in inexhaustible quantities.

The Mississippi Delta region, comprising nearly all of Louisiana and portions of Mississippi and Arkansas, is almost destitute of natural road-building material. The rock formations are in general few in number and inferior in quality. Good sand and gravel is almost lacking.

The plateau region of Texas is well supplied with limestones and sandstones, with occasional sections of volcanic rocks. Quite large gravel deposits occur in the northeast.

Arkansas is not quite so well supplied. The northern and western portions contain fair supplies of sandstones, some limestone and occasional deposits of chert and gravel.

Missouri is quite well supplied with road materials except on the bottom lands of the Mississippi and Missouri rivers. The limestones predominate, with some flint, granite and trap in local sections.

We have passed in a rather rapid review something of the past and present conditions of road-building in the South. But what of the future? From what we have seen of the past and present trend, it would no doubt be permissible to project the movement somewhat into the future. Looking backward, we see the early colonists in their struggles to conquer the wilderness. They had brought with them very largely the customs, laws, ideas and manners of the Mother Country. Road-building was looked upon as a purely local affair. And since each little local community was busy in building homes, clearing farms

and cultivating the necessary crops, but little time or attention was bestowed on the roads. The legislative assemblies made many and often stringent laws for the improvement of roads, but the enforcement almost invariably devolved upon the local communities. And even today we find that such laws, where they do not meet with popular favor, are usually honored only in their non-observance. It is, therefore, hardly surprising that we find more road laws than good roads.

And these old customs die hard. These methods of road administration, relics of the Elizabethan era, which the early settlers brought with them, are still in vogue in many sections.

Hopeful signs of rapid progress are, however, becoming abundant. It may be truly said that with regard to road improvements the South is in a period of transition. Seven years ago the work of road improvement had scarcely begun. Today the activity of the South is almost equal to that of the North. Community after community, State after State, is taking up the work and pushing it along with enthusiasm. Here and there mistakes are being made, it is true, but in general the movement is steadily tending toward a county unit system, supplemented by a State Highway Department. Such a system, when wisely organized, will provide for a sustained policy and make efficiency the object of its work. Every dollar expended will be made to give a dollar's worth of returns in good roads. The roads will be classified and the improvements adapted to the traffic requirements. In general, I am led to believe that 25 per cent. of our roads carry 75 per cent. of the traffic. In San Joaquin county, California, it was found that 20 per cent. of the roads carried 90 per cent. of the traffic. Hence, the problems of improving our roads is by no means as great as many would have us believe. It is more a question of wisely locating our improvements, so as to serve the greatest number. The South is today well started in working along right lines, and all indications point to a speedy perfection and general adoption of the best methods in the administration, construction and maintenance of her public roads.

Granites, Marbles, and Other Building Stones of the South.

By ERNEST F. BURCHARD of the United States Geological Survey.



FEW persons who are not directly interested in the stone industry realize that the value of stone at the quarries sold in the United States in the year 1910 exceeded \$76,500,000. As compared with the output of silver, valued at less than \$31,000,000, lead at \$32,750,000 and even of cement valued at \$68,750,000, the stone industry begins to impress one with its real magnitude. The value of gold produced in the United States in 1910 slightly exceeded \$96,000,000, and the only other mineral products that exceeded stone in value were petroleum, copper, clay products, pig-iron and coal. Stone, therefore, ranks seventh among the ten mineral products whose individual values exceed \$30,000,000 annually. Considering, however, the capital invested in these industries, that of stone will be found to drop below any of the other nine. These significant figures indicate that considerable importance must be attached to the stone industry as a producer of wealth. Of still greater significance, however, is the fact that the enormous stone resources available insure the steady continuity of the stone industry as a wealth producer so long as man shall demand stone as a structural and ornamental material in any of its varied forms. Practically every other mineral product is restricted in quantity. When the Conservation Commission took stock of the nation's mineral resources in 1909, it was found that the exhaustion of the known supplies of iron and coal could be foretold with some assurance of accuracy, and measures for their conservation have consequently been considered and put into practice. No attention whatever was paid by the commission to the conservation of stone resources, not because of their lack of importance, but because they are so enormous that no geologist or engineer can even approximate them. As to the outlines of the areas rich in available stone, definite knowledge is, however, at hand, and it gives me pleasure to indicate in a general way the supremacy of the South in granite, marble and other stone resources, and to call attention to the opportunities for their more active development.

Two of the most valuable stones in the South are granite and marble. The Piedmont region, more than 800 miles long, and 50 to 175 miles wide, extending from the northern border of Maryland to central Alabama, is underlain by crystalline siliceous rocks, largely granite and gneiss. Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama and the eastern edge of Tennessee therefore contain vast supplies of these durable rocks. In the lower Mississippi Valley the hard rocks are mostly covered by sands and clays, but granitic rocks outcrop in southeastern Missouri, central Arkansas, southern Oklahoma and in central and western Texas.

The marble areas in the South follow in a general way the grouping of the granite areas. Since most marbles have been formed by the metamorphism of limestone or dolomite under the influence of heat and pressure induced by intrusions or flows of molten rock, those beds of calcareous sediments that lie adjacent to granitic rocks and are older than the igneous material have been changed almost invariably to a crystalline granular condition; thus flanking the Appalachian granitic belt on the northwest there is from Northern Maryland southwest to Central Alabama a belt of crystalline limestone and marble. This belt is narrower than the granitic belt because it represents the up-turned edges of rock that dip away from the Appalachian axis and are

buried beneath younger rocks to the northwest. Not all the marbles of commerce are metamorphosed rocks, however. Some limestones in Tennessee and Missouri remote from igneous rocks are nevertheless so completely and uniformly crystalline that the stone is capable of taking a good polish and of being used as marble. Hence, commercially, such stone is properly termed marble. The Ozark region of Northwestern Arkansas, Southwestern Missouri and Northeastern Oklahoma contains almost endless outcrops of highly crystalline limestone, practically a marble, while in Texas near Austin and further up the Colorado river are large deposits of handsome marble practically undeveloped. There is in Eastern Oklahoma a deposit of true marble, which will be referred to later.

The Appalachian Valley region carries also a great succession of dolomite and limestone formations. Other extensive areas of hard limestone in the South lie in the Cumberland Plateau in Northern Alabama, Middle Tennessee and Kentucky, while softer limestone is found along the inner margin of the Coastal Plain in Southwestern Georgia, Southern Alabama and Mississippi, Southwestern Oklahoma and Central Texas, besides the deposits of coquina or shell limestone near St. Augustine, Florida.

Sandstone is present in abundance in the South; the harder varieties ranging from freestone to quartzite. In the Appalachian uplift sandstone lies northwest of and parallel to the marble areas in Virginia, Tennessee, Georgia and Alabama, also in the Cumberland Plateau in West Virginia, Kentucky, Tennessee and Alabama, and near the eastern border of the Piedmont region of Virginia and North Carolina. West of the Mississippi River there are enormous areas of good sandstone in Missouri, Arkansas and Oklahoma and in some of the formations on the inner margin of the Coastal Plain in Texas, Louisiana and Mississippi.

Having thus sketched the general distribution of these four classes of rocks in the South, some brief notes as to the character of certain well-known deposits of granite and marble may be of interest.

Granite.—In Maryland there is an abundance of good granite and gneiss within easy reach of Baltimore. Medium-grained, dark gray granite is quarried in Baltimore county near Woodstock, and porphyritic even-grained, dark blue and gray granite near Ellicott City. A fine grained, light gray granite occurs at Guilford. At Port Deposit and Frenchtown on the Susquehanna River high-grade gneissoid granite is quarried. These outcrops are on tide-water, which gives the material exceptional shipping facilities. Dark gray gneiss is quarried for local use in Baltimore, and dark blue gneiss in the District of Columbia for paving and concrete construction.

In Virginia areas of quarriable granite occur near Richmond, Fredericksburg and Petersburg. Much of the Virginia granite is schistose, but the workable material is mostly fine-grained, light to dark gray biotite granite, very similar to that of New England. The State, War and Navy Building in Washington, the most elaborate structure in the United States, is built of Richmond gray granite. Crushed stone and paving blocks are obtained from quarries of blue-gray gneiss on the Potomac River opposite Washington.

In North Carolina granite occurs extensively in the Piedmont plateau and the Appalachian region. Commercially, the most important areas are Mount

Airy, in Surry county, and the Dunns Mountain, or Salisbury district, in Rowan county. At Mount Airy about 40 acres of bare rock rises 128 feet above the railroad. The stone is light gray, of medium texture, and has an excellent rift and grain. The Dunns Mountain area contains light gray and pink granite. The postoffice building at Raleigh is built of this gray granite, and large quantities of stone are annually shipped from the Salisbury district to local and Northern markets. One hundred blocks of light gray granite, each 6x8x2 feet, were shipped from there to Reading, Pa., and large contracts have been supplied in Chicago, Ill. Buildings of the Catholic University and the first floor of the Municipal Building in Washington, D. C., are constructed of gray granite from near Salisbury, and large quantities of paving blocks are shipped from there to Baltimore, Cincinnati and other large cities. There are many other occurrences of gray biotite granite in North Carolina comparable to that on the coast of Maine, notably in Forsythe county, near Winston-Salem, and near Greensboro, Guilford county.

In South Carolina the supply of granite is abundant. In Fairfield county, near Winnsboro, are quarries of fine-grained gray granite of good commercial quality. The State Capitol was built from light gray granite quarried near Columbia. Granite is quarried also in Newberry, Lexington, Edgefield, Lancaster, Pickens, Greenville, Greenwood, Abbeville, York, Union, Spartanburg, Chesterfield, Anderson, Oconee and Laurens counties.

Georgia is the most important granite producing State in the South. The Piedmont region, comprising 61 counties, very generally contains granite, although as yet quarrying is carried on in only ten counties, four of which are important producers. According to Watson* the five principal areas of granite and gneiss quarried in Georgia are (1) Elberton-Oglesby-Lexington, (2) Lithonia-Conyers-Lawrenceville, (3) Fairburn-Newnan-Greenville, (4) Stone Mountain, and (5) Sparta. At present the most important commercially of these are the Lithonia and Stone Mountain areas; the stone from which is used principally for structural purposes and for road making and paving. Beautiful monumental granite is obtained from the Oglesby-Lexington area. The principal types of Georgia granite are biotite granite, the most common type, muscovite-biotite granite, and biotite-bearing muscovite granite. Texturally they are even-grained and massive, porphyritic, and gneissoid or banded. Stone Mountain is one of the best known granite areas in the United States. It rises 686 feet above the surrounding plain and has a circumference of about seven miles. The rock is a fine-grained, light gray, biotite-bearing muscovite granite. Twelve tests of its crushing strength ranged from 12,000 pounds to 28,000 pounds per square inch, and averaged over 16,000 pounds per square inch.

In Alabama much good granite occurs in the crystalline areas, especially in Lee, Tallapoosa, Chambers, Randolph, Elmore, Chilton, Coosa, Cleburne and Clay counties. Small quantities of granite and gneiss have been quarried for local use, but no regular quarries have yet been opened, largely because the most promising areas are remote from railways. Some of these areas contain low dome-like masses of bare granite 200 acres or more in extent, locally called "flat rocks" and which offer favorable quarry sites.

In Southeast Missouri there are large quantities of granite, particularly in Madison, St. Francois, Iron, St. Genevieve and Wayne counties. A most attractive Missouri granite is the coarse red variety quarried at Graniteville, Iron county; and Syenite, St. Francois county. These deposits yield blocks of almost any size desired. Missouri granite has been extensively used in St. Louis and Chicago structures, and is shipped to Los Angeles and San Francisco.

In Arkansas there is a total area of about 14 square miles of granitic rock, termed syenite. It occurs at Fourche Mountain, Pulaski county; at Magnet Cove, at Potash Sulphur Springs, and in Saline county. The Fourche Mountain rock is known as blue granite or Pulaskite. It is used extensively for structural purposes, monumental work and paving. It is very hard and has shown one of the highest crushing strengths yet recorded for granitic rock, namely 34,950 pounds per square inch, with an average of 30,900 pounds.

In Oklahoma granite and other associated igneous rocks occur in both the Arbuckle and Wichita Mountains. The Wichita Mountains granite is a light pink to dark red, fine to moderately coarse-grained rock. Gabbro, or black granite, an excellent monumental stock, also occurs. Granite is quarried in the Wichita Mountains at Granite City, Mountain Park and Cold Springs, and there are many other sites favorable for quarrying near railroad lines. In the Arbuckle Mountains granite occurs in three areas, containing altogether more than 100 square miles of crystalline rock. The rock is generally coarse-grained and of a pink color.

In Texas the important granite area is in Burnet, Llano and Gillespie counties. Both red and gray granite of coarse and fine textures occur. A medium to coarse-grained pink granite is quarried on a large scale at Granite Mountain, Burnet county. The State Capitol at Austin is constructed of rock from this quarry which afforded also the blocks and crushed stone for the great sea wall at Galveston. The gray granites of Llano county are largely used for monumental work in the Southwest. Paralleling the Rio Grande in Western Texas are several areas of igneous rocks containing undeveloped granite.

Marbles.—The Maryland marbles are of great economic importance. The marble belt lies 12 to 20 miles north of Baltimore. A white, medium-grained dolomite marble is quarried at Cockeysville, where 26-foot monoliths used in the National Capitol, are reported to have been obtained. The stone in the lower 150 feet of the Washington Monument was obtained at Texas, Maryland. Variegated marble occurs in Carroll and Frederick counties, and serpentine verde antique is found in Harford, Baltimore and Montgomery counties.

In Virginia the central portion of the great valley is underlain by crystalline limestone, which may yield good marble in places. Some of the varieties are dun-colored, blue, gray, white, red and shaded. Deposits of statuary marble are reported from Tye River and from Goose Creek in Loudoun county, and from Goose Creek also a beautiful green verde antique.

In the Carolinas marble is not yet produced extensively, but large deposits

have been located by geological surveys, especially in North Carolina. White gray and pink marble occurs in Swain, Cherokee, McDowell and Macon counties, North Carolina.

In Tennessee, the white, gray, pink and chocolate marbles quarried near Knoxville are famous for their variety of colors, for the peculiar effect produced by the fossils, and for the high polish they are capable of receiving and retaining. Marble occurs in 15 or more of the counties in Eastern Tennessee, and in six or more counties in Middle and West Tennessee. Tennessee marble is principally a highly crystalline limestone, or commercial marble. Tennessee ranks third as a producer of marble in the United States.

Georgia at present is the largest producer of marble in the South, and the second largest producer in the United States. Marble deposits cross the north-western corner of Georgia through Fannin, Gilmer, Pickens and Cherokee counties. The beds are comparatively thin and intercalated with gneiss and mica-schist. In Fannin county the marble is fine-grained, white to gray in color, and in places banded with black. In Pickens county, where the greatest development has occurred, the marble is coarse but even-grained, and white to gray in color. Serpentine or verde antique, used in interior finish, is quarried near Holly Springs, Cherokee county, and occurs at other places. Georgia marble is shipped extensively to distant points. The Capitol at Providence, R. I., and the Corcoran Art Gallery at Washington are constructed of this material.

Alabama possesses white, colored, veined and black marbles. The finest deposits of white marble are in Shelby and Talladega counties, the latter county being the site of extensive quarries. The interior of the Day and Night Bank, New York city, is decorated with polish work, ornaments and statuary cut from this white marble.

In the Ozark region of Missouri, Arkansas and Oklahoma, several beds of light gray, crystalline limestone afford abundant supplies of commercial marble, such as the stone quarried at Phoenix and Carthage, Missouri, and at Batesville, Arkansas.

In Oklahoma near Marble, Sequoyah county, true marble has been found in adequate quantities. Its color ranges from pure white to pink, and in places it is mottled. This marble has been quarried and used in several public buildings in the State.

In Texas dense sub-crystalline bluish limestone, which will probably take a good polish, outcrops in Colorado River at Marble Falls. Cretaceous limestone in San Saba county is reported to be entirely crystalline and suitable for interior work. White and black marble is reported to occur in Brewster county, and other varieties in Burnet, Llano and El Paso counties. At the Bureau of Economic Geology, University of Texas, there is a fine collection of local marble, granite and other building stone which indicates that Texas possesses an abundant local supply of building and ornamental stone.

General Considerations.—In the Southern States south of the glacial boundary the surface rocks have been exposed to long-continued decay and disintegration. Erosion has not removed this residual material rapidly enough to keep fresh rock exposed, and in the absence of glaciation which in the north has planed from the rock surface accumulations of past ages of disintegrated rock, the granites, marbles and other stones here considered are for the most part badly weathered at the surface, or else are in many places buried under residual soil and detritus. These conditions have hindered quarrying in two ways; first by obscuring rock outcrops and thereby preventing discovery of good deposits; and second, by rendering the rocks, where visible, of unsound and unattractive appearance. If these facts are given due consideration in prospecting, early discouragements may be overcome and deposits of unexpected value are more apt to be discovered.

Two facts which have a vital bearing on the development of the granite and marble of the South have become readily apparent: First: the greater accessibility of the local deposits to home markets, as compared with competitive supplies in Colorado, Wisconsin and New England; second, the commanding position which the South really occupies but does not fully enjoy with regard to supplying markets in the East, Central and Middle Western States, and to the possibility of developing an export trade. Granite quarries on the Maine coast have long enjoyed the advantage of loading rock directly on board vessels bound for Boston, New York and Philadelphia, and water shipments have even been made to Gulf ports in competition with nearer supplies of rock. Southern quarries that are on or near tide-water should possess equal advantages, and it has been shown above that many of the available deposits of granite in the South are situated along the fall line, which is at the head of tidewater navigation. The rapidly growing Southern cities—Atlanta, Birmingham, Chattanooga, Nashville, Memphis, Louisville, New Orleans, Houston, Galveston, San Antonio, Austin, El Paso, Kansas City, St. Louis, Richmond, Norfolk, Washington, Baltimore, are all much nearer the Southern stone areas than to other supplies, yet only three Southern States produce more than enough granite to supply local demands, and the same is true with regard to marble production. The cities of Philadelphia, Wilmington, Pittsburgh, Cleveland, Columbus, Cincinnati, Indianapolis, Chicago and Omaha are situated in territory that, for the most part, should be supplied most advantageously by stone from Southern quarries. Excessive freight rates, however, are certain to retard the development of stone quarries, for stone is a bulky product, and vigilance is necessary not only in order that reasonable rates shall be maintained on quarry products but that the local quarry products shall not be discriminated against in favor of remote materials. Two important advantages inherent to the South are her climate, which permits quarrying throughout the year, and her cheap labor supply. One of the signs most encouraging to the Southern quarrying industry is the fact that, taken as a whole, the building stones of the South are as yet among her least-developed resources. Only recently has there arisen an urgent necessity for large and substantial buildings and for extensive public works in the South, but now that the demand for materials of construction has become steady and strong, good opportunities certainly await the energetic and far-sighted development of the building stone resources of our Southern States.

*Watson T. L. "The Granites of Southeastern Atlantic States," Bull. U. S. Geol. Survey, No. 426, 1910, p. 210 et seq.

The Copper, Lead and Zinc Industries of the Southern States

By C. E. SIERENTHAL of the United States Geological Survey.*



HE commercial deposits of these metals in the Southern States are limited to the Appalachian region, the Western Kentucky region, the Ozark region, the Arbuckle Mountain region and Western Texas. The lead deposits were naturally the first to be developed because of their greater utility at the time and their easier winning and reduction by primitive means, and they were worked in Colonial days. The exploitation of copper and zinc deposits followed much later and in the order named, important copper production in the Southern States dating from about 1850 at Ducktown, and zinc production of consequence commencing in Missouri in 1869, and 10 years later in Virginia. The mines of the productive districts of the Southern States, as enumerated above, produced, in 1910, ore containing 8540 short tons of copper, at the average price of \$2,169,143 and constituting 1.6 per cent. of the copper production of the United States for that year. The lead ores contained 166,552 short tons of lead, worth \$14,656,614, being 42 per cent. of the total output of the country for that year. The zinc ores yielded 150,972 short tons of zinc, worth \$16,304,992, which was 46 per cent. of the total yield of the whole country. The production in 1911 probably did not differ materially from these figures. The only change in the last five years in the output of these metals in the Southern States as compared with the output of the rest of the country has been a slight relative loss in zinc production, which has been more than compensated by a relative gain in lead production. It may reasonably be inferred that this trend in the relative production of lead and zinc will continue for several years, and that the copper output will probably make considerable gains.

The production by individual States in 1910 is given in the following table:

Copper, Lead and Zinc Produced by Mines of the Southern States During 1910, in Short Tons.

	Copper.		Lead.		Zinc.	
Virginia.....	3	\$686	90	\$8,750	794	\$85,738
North Carolina.....	70	17,845	.....	.....	.....	.....
Tennessee.....	8,419	2,138,391	.....	.....	966	104,358
Kentucky.....	.....	.....	41	3,608	6	618
South Illinois.....	.....	.....	272	23,936	.....	.....
Missouri.....	47	11,995	161,016	14,169,408	128,589	13,887,612
Kansas.....	.....	.....	2,412	212,256	13,220	1,428,732
Oklahoma.....	.....	.....	2,888	254,144	6,304	690,552
Arkansas.....	.....	.....	63	5,544	904	107,352
Texas.....	1	226	33	2,904	.....	.....
Total.....	8,540	\$2,169,143	166,824	\$14,680,550	150,972	\$16,304,992

An important aspect of a metal industry is that of the metallurgical side. The smelting or reduction of the ore to metallic substances adds to the value of the product of the mines and gives employment to many men. Extensive copper smelting establishments are located in Baltimore, Md., and Ducktown, Tenn., while there are small plants at Dumfries and Norfolk, Va., and Fredericktown, Mo. There are lead smelting plants in Missouri at Desloge, Heruleaneum, Webb City, Granby and Joplin, and at Galena, Kans. Zinc smelters are located in Virginia at Pulaski, in Missouri at St. Louis and Nevada, and in Oklahoma at Bartlesville and Collinsville. There are zinc oxide plants at Austinville, Va., and Joplin, Mo., and the lead smelter at Joplin is the only plant in the United States which makes lead pigments directly from ore.

It is an interesting historical fact that the first production in the United States of metallic lead and of metallic zinc from their ores was accomplished in the South. The first lead smelted was in Virginia in 1621, as noted later, and the first zinc made was in the Government arsenal in Washington, D. C., about 1838. This zinc was made from the red zinc ore of New Jersey and used in the brass standard weights and measures.

THE APPALACHIAN REGION.

Maryland mines were numbered among the producers of copper until the expansion of the Lake Superior copper industry caused a decline of the more expansively worked deposits of the Appalachian region. The ores occur in three belts, in the western one of which, the New London, Dolly Hyde and Liberty mines were formerly extensively worked. In the middle belt, the Sykesville and Mineral Hill mines were operated for many years, the latter mine being active, until 1890. In the eastern belt, the Bare Hills mine near Baltimore yielded a large output of ore in the 20 years after its opening in 1866. The production of copper ore in Maryland in the last decade has been small, and there has been no output of lead or zinc.

Virginia was the scene of the first lead production in the territory of United States. In 1621 lead was mined and smelted near Falling Creek in that State for the purpose of making bullets to supply the local demands of the pioneers. Other early lead mines were those at Austinville, now worked principally for zinc. Prior to 1876 mining was confined exclusively to the lead ores. In 1879 the zinc mines at Bertha were opened and the remarkable purity of the metal made therefrom gained a wide reputation for "Bertha" spelter, and led to the building of the zinc smelter at Pulaski, which was still in operation in 1910. The lead and zinc deposits of Virginia, with one exception, were found in the magnesian limestones of the Great Valley region west of the Blue Ridge. But in Albemarle county, the Faber ore body consists of galena, zinc blende, and fluorspar, in crystalline schists cut by diorite and diabase dikes. Other

deposits of lead and zinc ore which have been worked are at Pulaski and Cedar Valley.

Virginia was also an early producer of copper. Bishop's "History of American Manufactures" mentions thirty hundred weight of copper ore as having been mined in that State in 1730. The copper deposits of Virginia occur in four districts. In the schists of the Blue Ridge region in Northern Virginia copper is widely disseminated which has led to much prospecting, but no paying deposits have as yet been found. In Southwest Virginia the "great gossan lead" is traceable for about 20 miles through Floyd, Carroll and Grayson counties, and in this distance a number of mines have been developed, which were particularly active in the fifties, yielding rich "black-copper" ore. The Virgilina district in Halifax county is the most important copper region of Virginia and it also extends through Granville and Person counties of North Carolina. The principal developments in the district, including a large number of mines, are confined to an approximate north-south belt having a length of about 18 miles and a width of two or three miles. The ores, consisting of copper and copper-iron sulphides, occur in lenticular quartz veins traversing schists. Though a fine body of ore was discovered in the Gillis mine as far back as 1856, and though considerable ore was taken out of the Blue Wing mine in 1886, it was not until 1897 that the district became really active. Among the most extensive workings are those of the High Hill mine of the Virginia Copper Co., Ltd., at the north end of the district, and those of the Yancey and Durgey mines of the Person Consolidated Copper Co., at the south end of the district in North Carolina. Both these companies are equipped with modern concentrating mills and have shipped high-grade ores and concentrates. Other openings in the Virginia part of the district are the Anaconda, Dorothy, Halifax and Chappel mines. In the Carolina portion of the district the Holloway mine also is extensively developed and has produced a large quantity of ore ranging from 12 to 30 per cent in copper content.

The North Carolina copper deposits are found in four districts, including the Virgilina district, just described. The mines of the Ore Knob district in Alleghany county were very profitably worked for many years, principally since 1873. The ore was self-fluxing and yielded ingot copper of great purity, comparable to that of the Lake Superior region. Various leaching processes were unsuccessfully tried in the reduction of the lower grade ore and eventually it was all treated in the smelting works at the mines. In the Tuckasee-gee district there are numerous prospects, but the Cullowhee mine is the principal one and the only opening which has been operated in recent years. In Rowan county the mines of the Gold Hill district yield some gold with the copper sulphides, and formerly the oxidized portions of the veins were worked as gold mines. The principal workings are at the Gold Hill mine, at the Randolph shaft of which an ore shoot was worked out that was 1500 feet in linear extent and 800 feet in vertical dimension. The Union Copper Co.'s mine near the Gold Hill mine also has important workings. In Davidson county some distance northeast of the Gold Hill district is the Silver Hill district. The Washington mine, known later as the Silver Hill mine, was operated from 1836-1852, reopened in 1853, and worked thereafter for some years. The ore consisted of argentiferous sulphides of zinc, lead, copper and iron. The opening reached a depth of 650 feet. The Silver Valley mines, located some six miles northeast of the Silver Hill mines, were worked in a desultory way from 1871 until the early eighties. In 1887 a smelter was erected at Thomasville to treat the ores of the district. The complexity of the ores and the quantity of zinc present prevented success, though costly experiments were made for several years.

In South Carolina no important deposits of copper, lead or zinc have ever been discovered. Copper is known to occur in Abbeville county, where the Saluda mine has recently been prospected. Copper also is found in association with gold in Saluda county, and with gold and pyrites in York county. A few thousand pounds of copper is thus occasionally produced in mining other metals.

Georgia has copper deposits in five counties. The Mobile and "Lot 20" mines are in the northern part of Fannin county, close to the Tennessee line, and are supposed to be on an extension of the Ducktown mineralized area, as they resemble in many respects the copper deposits of that area. The Wal-drop copper mine in Haralson county, and the Canton copper mine in Cherokee county are located upon what is known as the Dahlonega gold belt. The pyrite ore-body opened by the Chestatee Pyrites Co., in Lumpkin county, six miles east of Dahlonega, is situated upon the same belt. This deposit has been demonstrated to be of economic dimensions, and the ore assays three per cent. copper. The Magruder mine of the Seminole Mining Co. is located at the eastern border of Wilkes county. The upper oxidized portions of the deposit were formerly worked for gold, and later, when sulphide ores were encountered, copper and lead ores carrying gold and silver were shipped.

The copper deposits of Alabama are in the east-central portion of the State in the continuation of the Dahlonega gold belt. But two mines have produced important quantities of copper, the Stone Hill mine and the Smith mine, both in Cleburne county. The former mine was vigorously worked from 1874 to 1876, when the rich oxidized black copper ore was worked out down to the leaner sulphide ore. After two years' work upon the sulphide ore, operations were discontinued in 1879. In 1896 an attempt was made to reopen the property, but it was unsuccessful, in part owing to the distance of 20 miles from railway transportation. The Smith mine is located a mile northeast of the

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Stone Hill mine. It was extensively worked from 1870 to 1879, during the first six years of which it produced \$1,300,000 worth of ore.

The Tennessee copper districts are in the Ducktown district in Polk county in the extreme southeastern part of the State. The district was one of the earliest large producers in the country. Operations began about 1850, and from that date until the close of the Civil War there was a large production from the oxidized black-copper ores. With the exhaustion of these rich secondary deposits, attempts were made to work the lean original sulphides. These efforts met with indifferent success, and in the late seventies the smelters shut down, thus ending the first period of activity. The present period of activity began in 1890, since which time the district has produced steadily from the sulphide ores. The total output of the district up to the close of 1910 is estimated at approximately 105,850 short tons of copper.[†] The production for 1910, as given near the beginning of this article, was the output of two companies, nearly three-fourths of the total being made by the Tennessee Copper Co. and the remainder by the Ducktown Sulphur, Copper & Iron Co. The average yield for the year was 30.4 pounds of copper to the ton of ore, or about 1.52 per cent. The large capacity of the plants, the manufacture of sulphuric acid, cheap fuel and labor, and the lack of necessity for timbering, have all been factors which have made it possible to mine and treat the low grade ores. Both companies operate smelters and sulphuric acid plants, the enlarged acid plant of the Tennessee Copper Co. having been completed in 1911. This mammoth acid plant is much the largest and most complete in existence, having a capacity of about 200,000 tons of acid of 60° Beaumé. The Tennessee Copper Co. in 1910 mined and treated 424,197 tons of ore and reported ore reserves at the close of the year of 4,563,671 tons, conservatively estimated, apparently insuring 10 years' future operation at the present rate. The Burra Burra, London, Polk county and Eureka mines operated by this company are developed by shafts respectively 980, 700, 588, 485 and 165 feet deep. The smelter and converter plant has a daily smelting capacity of 2000 tons of ore.

The lead ores of Tennessee are generally associated with the zinc ores, which are much the more abundant. The lead and zinc deposits chiefly occur along three northeast-southwest belts. The northwestern belt lies parallel to Powell River, and comprises the Straight Creek mine near New Tazewell in Claiborne county, and the various openings in the Lead Mine Bend area of Union county, the principal one being the New Prospect Mine. The Straight Creek mine has been worked at intervals for 25 years, yielding oxidized zinc ores formerly and zinc blende in later years. The New Prospect mine was worked for lead during the Civil War, and lead is still prominent, although recent operations have had the zinc blende ores in view. In winning the ore, large open pits have been excavated. Lead and zinc ores are found here and there for a distance of nine miles southwest of the New Prospect mine. The southeast belt is mostly in Jefferson county, adjacent to the French Broad River, and embraces the openings at Leadvale and at Dandridge. In both these mines the zinc ores are intimately mixed with lead ore, making difficult the clean separation of the minerals. The central belt extends for more than 25 miles along the Holston River valley in Knox and Jefferson counties. It is in this belt that most of the active development work of the last two or three years has been done. The ores of this belt are exclusively zinc ores, carbonate and blende, and quite free lead and iron. The spelter made from them is, in consequence, of high quality. The spelter produced by the zinc smelter operated at Clinton in the early nineties is reported to have commanded a good premium for its purity. The Roseberry mine near Mascot, Knox county, was opened in 1883, working carbonate ore from an open cut, which is 50 feet wide by 200 feet long. The mine is equipped with a small mill, and a shaft has been recently sunk to a depth of 200 feet. It is now operated by the Grasselli Chemical Company. The Holston mine yielded blende and carbonate ore from an open cut, but in 1905 underground mining began at a depth of 150 feet. The mill was remodeled and enlarged in 1908, and in 1910 the property was taken over by the American Zinc, Lead & Smelting Company, extensively engaged in mining and smelting zinc ores in Wisconsin, Missouri and Kansas. The shaft has been sunk to a depth of 300 feet, and is still sinking. A large mill is to be erected at Mascot. The Lay mine at Newmarket, Jefferson county, opened in 1892, has yielded silicate and carbonate ores from residual clays. The property is in active operation by the Grasselli Chemical Company, which has just completed a mill that will more than double the output. The Newmarket or Ingalls mine was operated until recently by the Tennessee Mineral Company. It has produced large quantities of ore, both carbonate and blende, from an open pit 50 feet in width and 165 feet in length. The Mossy Creek mine at Jefferson City has the largest workings in the region, consisting of an open cut 600 feet long, 75 feet wide and 40 feet deep. The ores were carbonates and silicates, with blende intermixed in places. The Branner and College mines at Jefferson City also show large open cut workings. Other deposits not in the three belts described are the Falls Branch mine, yielding blende ore at Falls Branch, in Sullivan county, the Valley Mount and Cedar Ridge lead prospects in Blount county, and the Blue Springs mine, six miles south of Cleveland, operated for many years as a lead mine.

THE WESTERN KENTUCKY REGION.

The Western Kentucky lead and zinc ores are associated with fluorspar deposits and are often produced as by-products in the recovery of the fluorspar. The productive area includes Caldwell, Livingston and Crittenden counties in Kentucky and extends northward across the Ohio River into Pope and Hardin counties, Illinois. The association of the ores with igneous intrusions, and with fluorspar and occasionally barite as gangue minerals, distinguishes the deposits of this region from those of the Mississippi Valley generally and from those occurring in the limestones in the Appalachian region. Owing to dullness in the fluorspar industry in latter years the lead and zinc production has been much smaller than formerly. The construction of new and larger

mills in Southern Illinois and the recent opening up of promising zinc deposits in Kentucky offers encouragement of larger production in the immediate future. Lead ore has also been mined to a limited extent in Central Kentucky.

THE OZARK REGION.

The Ozark region has four producing areas, the Southeast Missouri, Central Missouri, Joplin and North Arkansas districts.

The Southeast Missouri area on the north and east flanks of the St. Francis Mountains is commonly known as the "disseminated lead" district from the fact that the ore occurs in disseminated form over wide areas, though relatively richer in the vicinity of intersecting crevices and joints. The lead deposits have been known and worked for about 200 years. The deposits at Mine La Motte, which have been worked almost continuously until the present day, were discovered in 1720. The opening of Old Mines, Mine à Gerbore, Mine à Burton, Mines à Lanye and Mine à Maneto followed later in the eighteenth century while the country was yet a part of the French possessions. About 1830 the lead production of the Upper Mississippi Valley region began to eclipse that of the Southeast Missouri district, which before that had supplied practically the whole output of lead in the country. It was not until the seventies, when the deeper disseminated deposits began to be exploited, that the output of the district began the steady growth which, in 1908, put it in the rank of principal lead producing district of the United States, a position it seems destined to hold for some time. The production of lead in 1910 was 131,449 tons, or one-third of the total production of the country. This lead was derived from 3,693,523 tons of crude ore, giving an average metal content of 3.5 per cent. The earlier workings were shallow, and even yet considerable shallow lead is raised, generally in connection with the mining of barytes, or "tiff," as it is locally known. The mines in the disseminated lead area range from 100 feet to about 550 feet in depth. The ore in these mines is almost altogether lead, although many of the deeper ores also carry a little zinc, and, especially near Fredericktown, in Madison county, considerable copper, nickel, and cobalt sulphides. The North American Lead Company, at Fredericktown, several years ago erected a smelter to save the copper, nickel, and cobalt, and until overtaken by financial difficulties made important production of those metals, being the only nickel and cobalt produced from domestic sources in the United States. In addition to the zinc blende found in the deeper mines, for many years zinc carbonate ore has been produced by the Valle mines. The lead output of the district is made by a few companies, financially strong, controlling large tracts of land and equipped with large and modern mining and milling plants. Among these companies are the St. Joseph Lead Co., the Federal Lead Co., the St. Louis Smelting & Refining Co., the Desloge Consolidated Lead Co., the Doe Run Lead Co. and the Mine La Motte Lead & Smelting Co. The combined daily milling capacity of the district is more than 15,000 tons of crude ore per 24 hours. The diamond drill is extensively employed in prospecting both from the surface and underground, cores being taken from the heading in various directions to determine which way to drive the heading.

The deposits of the Central Missouri district, comprising Morgan, Moniteau, Cole and Miller counties, consist of both lead and zinc ores. As the output from the district in recent years has been small and sporadic, and as the occurrence of the ore presents much resemblance to that in the Joplin district, a description of the Central district is perhaps unnecessary.

The Joplin district comprises the southwestern part of Missouri, the southeastern part of Kansas and the northeastern part of Oklahoma. The ores are galena and zinc blende, with more or less carbonate and silicate of zinc in the shallower workings. The Joplin district is the greatest zinc producing area in the United States, in 1910 yielding 148,212 tons of zinc, 45 per cent. of the total zinc production in the country. This was derived from 9,982,255 tons of crude ore. The high grade of the ore makes it especially desirable for the manufacture of spelter, metallic zinc, ores from other regions being in part made into zinc pigments. Of the total domestic spelter production in 1910, Joplin district zinc ores were used in making over 60 per cent. While there are numerous financially strong companies and individuals who control large tracts of mining land, they have usually operated these lands under the leasing system, and it is only recently that they have begun to undertake active mining directly. For this reason and because of the uncertain life of a deposit, except in the sheet ground, the mining and concentrating plants as a rule have not been large, the average capacity of plants constructed in recent years being somewhere around 300 tons per 10-hour shift. The same causes have operated to discourage the refinements of concentration, so that the average recovery is probably below 75 per cent. of the metal content of the crude ore. The productive area of the district extends from near Springfield, Mo., to Miami, Okla., a distance of 90 miles, and has a width of about 30 miles. Three general types of deposits may perhaps be distinguished. The commonest type is that of the irregularly shaped bunchy deposits in confused, broken, generally soft, ground caused by solution of the limestone members of the series of alternating limestones and cherts in which the ores occur. Another type is the "sheet ground" deposit, in which the ore body has a flat tabular shape and a thickness of 8 to 25 feet, and may be worked out, leaving pillars as in a coal mine. A third type occurs in the deeper deposits lying below the horizon of the sheet ground. These deposits have not as yet been explored sufficiently to disclose this exact character, but they seem in many respects comparable to the deeper lead deposits of Southeast Missouri; that is, to the so-called disseminated ores. The soft ground deposits, while they last, are the more profitable. The average lead and zinc content of the "soft ground" ores of Southwest Missouri in 1910 was 2.5 per cent., as compared to 1.6 per cent. for the "hard ground" sheet ores. The lower tenor of the sheet ground ores is compensated, however, by their greater extent, so that their exploitation largely resolves itself into a question of reducing unit cost by increase of capacity. Wherefore the best mining and milling plants are to be found in the sheet ground region. The sheet ground deposits are not coextensive with the district, however, but so far as known are limited to an area east of Joplin, ex-

[†]Butler, B. S. Chapter on Copper in Mineral Resources of the United States, 1910.

tending from Oronogo, through Webb City, to Duenweg, which is the region of original and typical sheet ground deposits. There is also a smaller area of sheet ground deposits just west of Joplin, another in the vicinity of Carl Junction, and still another near Quapaw, Okla.

In Arkansas lead and zinc deposits have been known for many years. Lead was noted by Schoolcraft in his travels in 1819, and has been mined in a desultory way since the settlement of the State. One of the earliest zinc smelters in the United States was set up at Calamine, Sharp county, in 1857, but it was unsuccessful, and smelting operations were soon discontinued, though 100 tons of zinc carbonate ore were afterward shipped. Perhaps a dozen small lead furnaces have operated for short periods at different times. Present development dates from about 1899, when there was a great rush to the Northern Arkansas field. The mines are principally in Marion county, and in the adjoining portions of Searcy, Newton and Boone counties, though there are also numerous mines and prospects in Baxter, Izard, Sharp, Lawrence and other counties to the east, and a deposit has recently been developed in Washington county on the extreme west border of the State. Until recently the mines labored under the disadvantage of a long wagon haul to the railroad and of high freight rates. The completion of the White River branch of the Iron Mountain Railroad, and of the North Arkansas Railroad, has brought most of the producing mines within 10 miles of railway transportation and greatly improved the situation in this regard. Mining and milling methods are similar to those in vogue in the Joplin district, except that, owing to the rugged character of the country, many deposits have been found outcropping on the hillside and have been followed in by tunnels.

THE ARBUCKLE MOUNTAIN REGION.

In the southern part of Oklahoma prospecting for lead and zinc has been prosecuted in the neighborhood of Ravia, at the southeast end of the Arbuckle mountains, and in Murray county eight miles southwest of Davis, near the northwest end of the same range. The Davis mines became productive in 1909, and made increased shipments in 1910. The ore so far shipped has consisted mostly of zinc carbonate, gained from open pits and shallow shafts. A few shafts are reported to reach depths of 40 to 60 feet and to have shown deposits of zinc blende. A few cars of blende concentration have been shipped. There are several concentrating mills in operation and in course of construction, and prospecting was very active during 1911.

TEXAS.

The zinc and silver-lead mines of Texas are chiefly in the trans-Pecos, or western part of Texas, and for that reason belong, strictly speaking, to the Rocky Mountain region. In the central Texas region there are lead prospects on Silver Creek, near Bluffton, Burnet county, and zinc-fluorspar prospects on Spring Creek, 7 miles west of Burnet. In the western part of Texas, in Brewster county, near Alpine, the Bird mines have shipped some argentiferous lead ore, and in the adjoining Presidio county the Shafter mine is the most important silver-lead mine of the State. In the Quitman mountains of El Paso county the Bonanza and Alice Ray mines have produced silver-lead-zinc ores. In the same county the Davis and Robinson mines, near Torbert, and the Beck mine, near Boracho, have made important shipments of zinc ore.

The Agricultural Potentialities of the South

By ANDREW M. SOULE, President of Georgia State College of Agriculture.



THE SOUTH has been transformed agriculturally in a period of thirty years. Those who doubt the authenticity of this statement need only turn to the recently published statistics of agricultural production and be convinced. With the close of the great war the plantation system passed into history, and there were few who believed the South could recover from the destruction wrought by the great conflict in a hundred years. Nevertheless, agricultural industries have made such great strides in the past quarter of a century as to make it evident that the South will presently outstrip all other sections in the value of her farm crops and take high rank among the States in many other lines of agricultural industry as well. In this connection, bear in mind that the results already attained have been achieved in the face of the gravest difficulties. First of all, there was an exhausted credit and an impoverished people to feed and clothe; neither suitable implements or animals were available to work the land; the labor system was completely disorganized; fences and buildings had disappeared; the well-kept terraces were broken down, and fields, once fertile, were well-nigh washed away. The pioneering age of the grand-sire had returned again to the South, and it devolved upon her native sons to reclaim a great empire through their own individual effort, for immigration to this section of the country has never taken on the great proportions of the North and West. This phase of the situation has been presented so that the reader may bear in mind something of the conditions which confronted Southern agriculture in the recent past. He will then be in position to appreciate more clearly what has been accomplished already and to understand that the statements made with reference to future development are, if anything, ultra-conservative, and certainly not exaggerated.

It is not surprising to one familiar with the natural resources and the splendid possibilities of the South that so much should have been accomplished in so short a time. To this section nature has been unusually kind in providing soil and climatic conditions which enable the cultivation of a wide range of crops, including not only those having the greatest ready money value, but which are regarded as the standard food crops for man and beast throughout the civilized world. The topography of the country varies from the mist-enshrouded mountain tops to the level sands of the seashore. There is a great range of soil types which enable the husbandman to harvest truck crops in their greatest perfection on the one hand, and the peach and apple of northern latitudes on the other. While the corn, wheat and hay of the temperate zone are grown successfully, the fleecy staple thrives as no where else in the world. Conditions have been greatly helped by the remunerative prices which cotton and other farm crops have brought in the last five years. Striking evidence of this increased wealth is shown on every hand, but is especially evidenced by the widespread interest in road improvement, the extension of rural mail routes and telephone systems, and the construction of superior types of school-houses, farm homes, barns and fences.

Some may imagine that these conditions have been brought about by the expenditure of an undue proportion of the energies of the people or at the expense of the natural resources of the country. Such is not the case. The South is just now ready through the splendid service of a new generation to make the greatest forward movement in the history of her agriculture, and she represents a golden empire of natural resources, the fringes of which have scarcely been touched. To say that the agricultural production of the South will double, treble or even quadruple within the lapse of another half century is not stating the case extravagantly, if one study the past history of this territory and reflect especially on the progress made in the last decade. This period is mentioned, as it covers the time since sufficient surplus wealth has been accumulated to permit of the organization of agricultural industries along more aggressive and constructive lines. If so much has been achieved in the

past in the face of great difficulties, what may be anticipated under vastly more favorable conditions? This is a question of concern, not only to every citizen of the South, but of the United States as well, and will have a reflex action on the welfare of nations across the seas. It is well worth while, therefore, to consider seriously the factors which have brought about the present degree of development and to anticipate what may be expected in the near future.

Four agencies have materially affected the prosperity of the South in the past, and these will influence her development with multiplied intensity in the immediate future. These agencies may be summarized under the heads of (1) agricultural education; (2) better farming and crop diversification; (3) expansion of home markets and a relative decline of competition in agricultural production from the West; (4) a rapid widening of markets abroad, which will be greatly enhanced by the completion of the Panama Canal.

AGRICULTURAL EDUCATION.

Education is the greatest constructive agency in the growth of a nation. For years much prejudice existed against the so-called scientific agriculture, and it is only recently that farmers have come to realize that success depends upon a fundamental understanding of the laws of nature as related to soils, plants and animals. For a quarter of a century after their establishment the agricultural colleges of the South made comparatively little progress and did not accomplish in the advancement of farm practice what they could and should have done had the farmers' attitude toward them been one of less indifference. Consequently, agricultural progress and production stood still for some years, or even sunk below the level of former generations. Naturally, when the farmer failed to secure adequate returns from fertilizers or from the methods of cultivation which he had been pursuing in the past, he sought for the cause, and presently it dawned upon him that his methods of practice were out of date and not in proper touch with the scientific knowledge agricultural workers had accumulated. It was natural for a reaction to set in, with a result that has been highly gratifying to all the interests concerned. A marked increase in attendance in all the agricultural colleges of the South has been witnessed in the past two or three years, thus insuring the training of competent leaders, teachers and investigators. The short course offered for the instruction of adult farmers have been unusually well patronized, insuring a new point of view and a broadened vision for the adult. The number of farmers' institutes and the attendance on the same has greatly increased. In several agricultural colleges in the Southern States extension departments have been organized for carrying into rural communities a more definite knowledge of the principles involved in an improved agricultural practice.

Boys and girls' clubs have been established in association with the schools, the boys giving their attention to the growing of corn and the management of live stock, and the girls to canning and domestic science work.

What is being accomplished in Georgia through the co-operative effort of various agencies will illustrate in some measure the great transformation which education in agriculture is bringing to pass throughout the South. During the past three years the Georgia State College of Agriculture has operated two educational trains, and held 758 farmers' meetings, attended by 576,633 persons. The distance traveled by the extension workers aggregated 178,517 miles and involved more than 1522 days of travel for a single man. It will thus be seen that one-third of the white population of the State was reached through the department of agricultural extension in a remarkably short time. The demand for meetings has increased to such an extent that in spite of liberal appropriations on the part of the State all the requests received cannot be complied with. Letters seeking specific information about farm topics have increased from a few hundred to many thousands annually, and still the

farmers' thirst for definite information to replace the superstitious and frequently absurd practices of the past remains unslaked. Everywhere the leaven is at work, and the agricultural revolution so long predicted has become a reality in many communities. The following of extension teaching in agriculture as a factor in determining our future rate of progress is well illustrated by the following citation:

An educational train was operated in the State of Georgia during the winter of 1911. It traveled throughout the length and breadth of the State for 47 days, and during that time was met by 350,000 people. At every stop soils, seed selection, the cultivation and fertilization of the land were discussed in detail. The farmers were inspired and told how they might better their condition and increase their crop yields. Statistics indicate that 300,000 tons more of high-grade fertilizer were applied to farm crops in 1911 than in the previous year, and up to the time of writing much more cotton has been harvested and ginned than in 1910, and it is stated by conservative men that the cotton crop of 1911 will exceed in amount that ever before produced in the State by more than 500,000 bales. This cotton, even at \$50 a bale, represents a money value of \$25,000,000, and illustrates the powerful relation of extension teaching to the rural betterment problem. No one agency should attempt to claim all the credit for the results secured, as many factors entered into the situation, but the power of concrete information adequately disseminated must never be lost sight of, and illustrates very clearly that progress can be made in agricultural production and development in the South as the exigencies of the situation demand.

Boys' and girls' work has been carried on in Georgia in more than ninety-six counties during the past year. Girls have made more than \$20 from the fruit canned from a quarter of an acre of ground devoted to tomatoes, and they have learned something of the possibilities of truck gardening, the importance of supplying the home with the luxury of fresh vegetables at all seasons of the year, and the desirability of adding to their own individual earning power. More than thirty boys last year raised over 100 bushels of corn per acre in Georgia. One boy grew 214 bushels. This corn was grown at a cost of from 12 to 40 cents a bushel. These boys have shown their fathers that it is possible to increase the average yield of corn per acre five or six times at a surprisingly low cost. The need of an abundance of food for the maintenance of our live stock has been a stumbling-block in the way of Southern progress for many years. This difficulty is now to be removed through educational processes, which are to relate the rural school to the life of the home in the most efficient and constructive manner which has ever yet been devised.

If these results have been obtained in a period of three years with an insufficient number of workers and with inadequate financial support, it is certainly not overstating the case to say that with a new generation of boys and girls, whose vision has been broadened and directed along right lines, that the agricultural progress of the South will be quadrupled within the next forty or fifty years. While these citations refer especially to the changing conditions witnessed in Georgia, it should not be forgotten that many other Southern States are making the same relative advancement.

BETTER FARMING AND CROP DIVERSIFICATION.

Better farming is being practiced throughout the South. Manufacturers of agricultural implements now regard this territory as one of the most promising in the United States, and their faith is well founded, as the census figures will abundantly show. The day of the Boy Dixie plow and the little tow-headed mule is rapidly passing. The two-horse plow is taking the place of this ineffective implement. In many instances three-horse plows are being used, and it is not uncommon to find four big mules attached to some of the deep-tilling implements which our most progressive farmers are now using. Plowing with gasoline is becoming quite common in many localities. Naturally, the soil is now being broken to a depth of twelve inches in many instances, and frequently subsoiled to a depth of six inches below this point. It then becomes capable of holding the greater part of the abundant and uniform rainfall which characterizes the South. Thus, drought periods are becoming less destructive, while washing and erosion are being lessened. The ability of the plant to range through the soil and gather an abundance of food and water is greatly facilitated by better preparation and cultivation, and thus our whole agricultural economy is being changed as the result of an increasing use of the better types of farm implements. The rapid introduction of labor-saving devices is doing much to solve the labor situation, for from four to six mules are now frequently worked by one man in the place of five or six men, as was the case a generation ago. So much more is now known and appreciated about fertilizers that their more intelligent and general use in supplying the soil with the elements in which it is most markedly deficient is resulting in increased yields of not only corn and cotton, but truck and other farm crops as well.

With the employment of large plows has come an increased interest in live stock husbandry, for it is evident that more power in the collar will be necessary to pursue the type of farming which has now been demonstrated to be the most profitable. In one Southern State more than two hundred Percheron mares have been introduced in the last few months, the intention of the owners being to raise additional mares until a large enough number of breeding animals have been secured to justify their use in raising mules. Presently these farmers will not be under the necessity of sending \$250 to \$300 out of the South to buy an animal which they can bring to a workable age at a cost of from \$60 to \$80. The eradication of the cattle tick is being prosecuted with vigor in many sections of the South, and, as a result, there is a growing interest in dairy enterprises and in the utilization of waste land for beef-raising. It has been shown by so many experiments that yard manure is one of the best materials for renewing the vigor of Southern lands that farmers are now fully awakened to the importance of this matter and are striving to develop live stock industries in some measure commensurate with the needs of the situation.

For years the South was noted chiefly for the growth of a single crop—that of cotton, and, in fact, the tendency in this direction is altogether too strongly marked at the present time; but as the facts recited in this paper indicate, this difficulty is being overcome and much greater attention is now being given to the cultivation of corn than was ever accorded to this crop in the past. But attention is not being centered on corn alone, as there is a distinct diversification in practice all along the line as witnessed by the variety of crops now grown and shipped in such abundance as to have given this section a national reputation. Who is not familiar with the citrus fruits of Florida, which are annually being marketed in greater variety and perfection; with the lusciousness of the Georgia peach and watermelon; with the splendid qualities of the apples of Virginia, Tennessee, Georgia and Kentucky; with the sugar-cane and rice of Louisiana and Texas, and with the splendid horses, mules and cattle of Texas, Kentucky, Tennessee and Virginia. In no section of the world comprising an equal area can so great a variety of crops be grown in perfection, and the South is rapidly coming to a realization of the importance of this fact. The cultivation of every one of the crops mentioned may still be regarded as an infant industry, and will undoubtedly be greatly extended in the next few years because of discriminating markets developing at home and in other sections of the country as well. The tendency to diversification is also being stimulated by the relatively large increase in urban, as compared with rural, population throughout the United States.

EXPANSION OF HOME MARKETS.

Many forms of agricultural practice in the South languished for years as the result of competition with the rich, fresh and highly productive lands of the Middle West. At that day a comparatively sparse population occupied these virgin soils. Within the past fifty years great consuming centers have been developed throughout not only the Middle West, but in the South and East as well. With the dividing up of farms in the Middle West and their depletion in fertility, the problem in that section has become one of supplying the local markets. There is undoubtedly at the present time a dearth of beef-producing animals. Good milk and butter are not being made in sufficient quantities to meet the market demand. The West no longer has an unlimited supply of corn for exportation to other sections of the country, while the wheat fields are decreasing so in yield as to menace the nation's supply of bread. These things are exerting and will exert in the next few years a marvelous influence on the growth of agricultural industries in the South, for there is a vast territory responsive to the touch of human energy in the Piedmont region capable of growing all the crops for which the West is celebrated, not only in abundance, but with profit to the owner as well. In the foothills of the Appalachian Mountains and in the coastal plains area there are millions of acres of land forming an ideal range for all classes of live stock, and to this unoccupied and undeveloped acreage the people of the South must look in the near future for their supplies of bread materials and animal foods as well. The urban population of the South has increased marvelously in the last few years, and yet development has only commenced, because manufacturing enterprises, in spite of the giant strides made up to this time, are still in their infancy. The demand for home-grown foodstuffs of a perishable character is expanding at the present time in much greater ratio than the supply, and it is now becoming imperative for the home territory to raise these supplies for obvious reasons. It is not a question of markets, but of an adequate supply of raw materials to meet the requirements of the present situation, and it will be years before production in this line outruns consumption.

INCREASED FOREIGN MARKETS.

But the South not only faces the problem of supplying her home market with raw materials and food for her rapidly growing population, but of sending an adequate proportion to the markets of the world. The completion of the Panama Canal is now in sight, and when this is accomplished a territory of marvelous consuming powers lies ready for exploitation, and this territory is making progress more rapidly probably than we sometimes realize, so that whether we seek to exploit it as vigorously as we may, it is likely to make demands upon us of its own volition. Not only is the continent of South America made more readily accessible and available for the products of our farms and factories, but the great consuming centers of Asia are brought, relatively speaking, into close touch with the South. The eyes of the world are upon us, and the opportunity of a nation lies before us. Will the South be ready to respond to the world-wide demand which is presently to be thrust upon her for many of the crops which she has been able up to this time to grow more cheaply and of a better quality than any other section of the world?

An affirmative answer should be given to this question for reasons either obvious or already stated. Here is an empire ideally located, geographically speaking, and possessed of Nature's greatest assets—a salubrious climate, varied soils, good water and an abundant rainfall. Anglo-Saxon integrity, intelligence and aggressiveness dominate and control it. Industrial and technical education adapted to the needs of all classes of citizens is appreciated as never before. A young generation, vigorous and unafraid, leads the vanguard of the fight for the widespread dissemination of essential knowledge affecting agricultural processes. The earth teems with latent energy and patiently awaits the coming of the husbandman who can bring the plant and the soil and the physical forces of nature into proper harmony with each other. A thousand experiments have shown that men of mediocre attainment may quadruple yields when taught a few fundamental facts. Why should the South fail to measure up fully to her vast agricultural potentialities with ample warning of the situation which is soon to confront her, and with the variety of agencies now at work to conserve, educate and direct the energies of her people?

Clay Products and Clay in the South

By JEFFERSON MIDDLETON of the United States Geological Survey.



HE wide distribution of clay and the comparatively large number of small clayworking plants scattered over the country are apt to deceive one in his estimation of the importance of the industry. Many will be surprised to learn that the annual value of the clay products of the United States is exceeded only by the value of two other mineral products, namely, coal and iron. But such is the fact, as shown by the reports of the United States Geological Survey. In 1910 the value of the clay products of the United States was \$170,115,974, the value of the coal production in the same year was \$629,557,021, and of the pig-iron \$425,115,235; for copper, the next in rank to clay products, it was \$137,180,257; for petroleum, \$127,896,328, and for gold, \$96,269,100.

In the distribution of this natural wealth the South has been bountifully supplied. No other section of the country is better supplied with valuable clays than this favored portion of our country, so rich in mineral wealth. Every variety of clay is to be found there, from the highest grade kaolin or china clay to that suitable only for the manufacture of common brick or flower pots, and the South is the principal, if not the only, source of white-burning domestic clays used by the American potters. Consequently, this region is the seat of a prosperous industry, as shown by figures that follow. Prosperous as this industry has been, the outlook for the future is still brighter. Abounding in valuable clays in every State which have scarcely been touched, that only await the necessity for their use, the clays of the South offer in this unrivaled building material—easy to win and to convert to the uses of man—one of the most certain of its sources of wealth.

An important factor in the development of a country is the ability to provide cheaply structures for occupancy by the people. The South has been abundantly supplied with timber, which it has used to the full, but she has also within her domain on almost every hand nearly inexhaustible supply of a far better building material—a material which she must utilize as her forests become exhausted. The time will come, and it is not so far away, when the magnificent clays of the South will be more generally utilized. With labor plentiful, good clays, cheap fuel and a climate which permits practically all-the-year work without protection from the cold, and a rapidly-increasing population, there is no reason why the clayworking industry should not prosper and increase in importance even at a greater rate than it has in the past 30 years. To show the growth of these industries, the following is given:

In 1880, according to the tenth census, the clay products of the Southern States, exclusive of Oklahoma, for which no figures were given, as there was probably no clayworking industry there at that time, were valued at \$6,792,001. At that time there were 1230 clayworking establishments, in which there was invested a capital of \$4,703,512; 16,209 persons were employed, to whom \$3,039,883 were paid in wages. In 1890, as reported by the eleventh census, the clay products of the South had increased in value to \$16,398,808. The number of establishments was practically the same as in 1880, though the capital invested had increased to \$17,815,409, and 25,561 wage-earners were employed, to whom were paid \$6,809,564 in wages. In 1899, as shown by the twelfth census, the number of establishments had increased to 1559, though the products had increased but little in value—to \$16,690,418, and the number of wage-earners had decreased to 24,075, but the wages paid showed a slight increase—to \$6,863,012. During the next 10 years there was a remarkable gain. The capital employed increased to \$62,287,731 in 1909 (from figures furnished by the thirteenth census) and the wage-earners to 44,307, and the wages paid to \$12,022,322, while the value of the products was \$31,238,628. In 1880 the value of the clay products of the Southern States constituted 16.5 per cent. of the total value for the entire country; in 1890, 18.2 per cent.; in 1899, 17.5 per cent., and in 1909, 15.7 per cent. These figures are all exclusive of the clay-mining industry, which is treated separately.

The clay products of the Southern States in 1909 composed about 10 per cent. of the value of all the mineral products of these States. In 1909 the value of their clay products was greater than that of any other mineral product, and in Georgia, Mississippi and North Carolina, and in Arkansas, it was exceeded only by coal, in Florida by phosphate rock, in Kentucky by coal, in Louisiana by petroleum, in South Carolina by phosphate rock, in Texas by petroleum, in Alabama and Maryland by pig-iron and coal, in Missouri by lead and zinc, in Virginia by pig-iron and coal, in Oklahoma by petroleum, coal and natural gas, in Tennessee by coal, pig-iron and copper, and in only one Southern State was it fifth in value of mineral products, namely, West Virginia, where it was exceeded by coal, petroleum, natural gas and pig-iron. In 1910 the clay products of the South showed a decrease in value of \$574,735 from 1909, or 18 per cent. This was due no doubt to local conditions, as 5 of the 16 States showed increases, and the industries throughout the country showed the greatest value of product of any year in their history.

Although almost all of the higher grades of pottery are made in the Southern States, white ware is made in only Maryland and West Virginia. With the South supplying all of the domestic clay used in the manufacture of high-grade pottery, it seems remarkable that that ware should be made only in border States. Some years ago an effort was made to establish a white-ware pottery in the South, but the enterprise was not successful. An attempt to establish a pottery for the manufacture of high-grade ware at Macon, Ga., during 1911 appears to have met with more success. With every raw material within easy access, there appears to be no insurmountable obstacle to the establishment of plants in the South for the manufacture of the highest grades of pottery. The principal difficulty in the way of a successful establishment of this kind in the South, or elsewhere, for that matter, is the lack of skilled labor. With the establishment of a successful plant a nucleus for the training of potters will be formed and this drawback will be removed.

The South has one art pottery of which it should be proud—the Newcomb pottery at New Orleans. This pottery was established some years ago in the Department of Arts in the Tulane University (Newcomb College), and its success in the making of artistic pottery is such that its products are known throughout the country. The ware is made entirely of Southern material.

As a general thing clay miners are also the manufacturers of the lower-grade clays, but as the higher grades of ware are reached the rule is that fewer and fewer manufacturers are also miners, until in the highest grades of ware the rule is that the manufacturer is not the miner of the clays that he uses.

The clay-mining industry of the South is growing in importance. In 1880, as reported by the census office, there were but three mines in the South, one in Maryland and two in South Carolina, reporting 7642 tons of kaolin, valued at \$28,147. The capital invested in this industry at that time was \$95,000, and 70 men were employed in it, to whom \$15,850 were paid as wages. In 1909 it is estimated that the capital employed in this industry was \$2,925,483; it employed (estimated) 1467 men, to whom \$448,393 were paid as wages, with a product of 547,559 tons of clay, valued at \$1,282,622. These figures represent only the clay mined and sold as such, and do not include the clay burned by the miner. For 1910 the production and value were still greater—736,019 tons, valued at \$1,458,778. This was 26.6 per cent. of the quantity and 37.4 per cent. of the value of the clay mined in the entire country in 1909, and 30.8 per cent. of the quantity and 40.2 per cent. of the value of that mined in 1910 for the whole country.

The following is a brief résumé of the clay resources of the South. It is not, of course, possible to single out undeveloped deposits, but an effort has been made to point out the geological horizons in which clays have been found as a guide to future development. In compiling these data free use has been made of the reports of the United States Geological Survey, State reports on the clays by the several States, and Ries' work on "Clays: Their Occurrence, Properties and Uses," published by John Wiley & Sons, New York.

Alabama.—The clay resources of Alabama have been studied by the State Geological Survey. The results of these studies were published in a bulletin—No. 6, 1900—and show that nearly all of the formations, ranging from the oldest to the most recent, contain valuable clay deposits. Kaolins, fire-clays, shales, pottery clays and loam suitable for the manufacture of building brick are found in this State. The residual kaolins and fire-clays are found in a triangle roughly drawn from the northwestern corner of the State to Columbus, Ga. The Cretaceous, the most important clay-bearing formation in the State, is found in a strip running southeast from the northwest corner of the State. It is widest on the western side, from 30 to 40 miles, but narrows rapidly on the east to only a few miles. This formation carries stoneware and fire-clays. The Tertiary clays occupy the southern part of the State. This section is said to contain valuable clays which have not been worked. The coastal plain contains clays suitable for brick-making.

Arkansas.—The clays of this State are described in Bulletin No. 351 of the United States Geological Survey—The Clays of Arkansas—by J. C. Branner. Kaolin, fire-clay, pottery clay, shales and clays suitable for building brick are abundant in this State.

Florida.—The most important clays of Florida are the white-burning plastic kaolins in the central portion of the State, occurring at several points which may represent portions of a formerly continuous bed. A deposit of this clay also occurs at Bartow Junction. Brick clays also occur in the northern part of the State, but they are often sandy, and are worked only on a small scale.

Georgia.—This State is rich in clays. In the northwestern corner of the State occur, in the Paleozoic area, white residual clays and shales. Residual kaolins should also be found in the pre-Cambrian belt running northeasterly and southwesterly from Augusta to Columbus. The coastal plain region from the fall line to the sea is very rich in clay. In this area are found the white-burning clays near Macon, which are used in the making of paper, fire-brick, tile and pottery. This clay also occurs at and near Lewiston and Gordon, McIntyre, Butler and at other places. It forms the basis of an important and growing industry. Brick clays also occur in many portions of the State. Sewer pipe, fire-brick and pottery are made at various points, while roofing tile is made from clays in Liberty county, but the most important clays of the State are the white clays of the Potomac formation near Macon.

Kentucky.—No complete report on the clays of this State has been published. The fire-clays of this State occurring in the coal-measure beds are undoubtedly the most valuable clays in the State. They occur in both the eastern and western portions of the State, though the former are better known. Fire-clay also occurs in Carter and Greenup counties in connection with the upper ferriferous limestone, and also accompanies many of the coal seams in parts of Jackson, Pulaski, Laurel and Rockcastle counties. The distinctive and interesting clays of the Jackson Purchase are treated in a report on the subject by the Kentucky Geological Survey. Brick clays are located in many parts of the State.

Louisiana.—The clay resources of this State are of comparatively minor importance, though there is an abundance of clay suitable for the manufacture of building brick. There are deposits of clay suitable for the manufacture of building brick along the rivers of Southeastern and Southwestern Louisiana which have been worked. The bluffs along the east bank of the Mississippi River from the State line to Baton Rouge, when they bear southeastward to near Lake Maurepas, contain clays suitable for brick-making. They are covered by a brown loam or loess and are not worked, except at Baton Rouge, where the loam has been removed and this clay is used; it has also been used at Clinton. Similar clays form an escarpment on the western side of the Mississippi from the State line to the Gulf at Coto Blanco Island. These have been worked at places with satisfactory results, but what are apparently the best of

them, those of Franklin, Richland and West Carroll parishes, have hardly been touched. Clays of a third group are found in pocket-like deposits in the modern alluvium of the Red River. When worked, as at Shreveport, they make an excellent brick. Other fair brick-making clays occur in Northern Louisiana. Outcrops of lignite shales that promise to be of value for the manufacturing of paving brick occur in Caddo and Bossier parishes, near Shreveport.

Maryland.—Brick clays are everywhere present in this State, and are largely used. Brick are made from the sedimentary clays of the coastal plain, from the residual clays of the Piedmont plateau and from the shales of the Appalachian region. Maryland clays, suitable for the manufacture of sewer pipe, occur in the Arundel formation. The fire-clays of Maryland have been long and favorably known. They are found in the Appalachian region, the best known probably being the Mount Savage. Fire-clays also occur in the coastal plain, some of which are highly refractory. Enamelled brick are made from shale and flint fire-clay from Savage Mountain. Kaolin beds, which are an extension of the deposits of Delaware, occur in Cecil county in two grades. The first is high-grade kaolin, which is used for paper-making, and the second grade is used as a fire-clay. Residual clays occur in Baltimore, Harford, Howard, Anne Arundel and Prince George's counties, some of which may be high grade, but most of which will only be suitable for refractory purposes.

Mississippi.—Clays and shales suitable for the manufacture of almost all varieties of clay products are found in this State. In the northeastern portion of the State there is a continuation of the Cretaceous formation of Alabama, containing clays and shales suitable for building brick, paving brick, sewer pipe, fire-brick and tile. The western portion of the State contains loams suitable for common brick. In fact, according to Bulletin No. 2 of the Mississippi State Geological Survey, every portion of the State contains clays suitable for some of the many uses to which this material is put.

Missouri.—This State is the richest of the Southern States in variety and value of clays and clay products, kaolin, ball clays, fire-clays, shales and brick clays being found there. Kaolin occurs in three districts: (1) Cape Girardeau, Bolinger and Howell counties; (2) Morgan and Cooper counties, and (3) Aurora and Lawrence counties. Only those of the first-named district have been worked. Flint fire-clays occur in the central portion of the State in basins or pockets from 50 to 200 feet in diameter and from 15 to 50 feet in depth. They are highly refractory. Plastic fire-clays are found in two different localities—Mexico and St. Louis. The former is worked at Fulton, Mexico and Vandalia. The St. Louis fire-clay is of high grade, some of it being used for the manufacture of glasshouse pots. So-called stoneware clays (usually impure fire-clays) occur in the coal measures, the most extensive of which are found in Henry county. Clays suitable for the manufacture of stoneware occur in the southeastern part of the State, and are used for that purpose. Impure shales suitable for the manufacture of paving brick are found in the coal measures. They are also suitable for the manufacture of sewer pipe, roofing, tile, terra-cotta, brick and fireproofing. Brick clays and shales are found in many parts of the State. The loess clays occur along the larger streams, and are from 75 to 200 feet in thickness.

North Carolina.—This State contains two distinct type of clays (1) residual and (2) sedimentary clays. The former occur in the coastal plain in beds from 2 to 20 feet thick. They are usually impure, and suitable only for common brick, except at Pomona and Grover, where they are semi-fire-clay. In Western North Carolina, in the Smoky Mountain region, there are many veins of pegmatite carrying quartz, feldspar and mica, which are usually decomposed to a depth of 100 feet or more, yielding masses of kaolin of much value in the manufacture of high-grade pottery. These deposits are the principal source of domestic kaolin. The most important deposit is near Webster, Jackson county. Other deposits occur in Haywood, Jackson, Montgomery, Richmond and Swain counties. The sedimentary clays occur extensively throughout the coastal plain, the best being located near Fayetteville, Goldsboro, Greensboro, Weldon, etc. These clays are usually only suitable for the manufacture of brick, though sometimes they are used for pottery. At Pomona a weathered shale has been used for making sewer pipe.

Oklahoma.—This State is well supplied with clays suitable for the manufacture of building and paving brick. The State is also well supplied with fuel, coal, oil and gas being plentiful, and transportation facilities are good. Oklahoma is growing rapidly, and there seems to be no doubt that the clayworking industries there have a bright future. So far no high-grade fire or pottery clays are known, but tests of the clays of only a small portion of the State have been made, and it seems probable that such deposits will yet be found.

South Carolina.—But little has been published concerning the clays of this State. The northwestern part of the State is underlain by crystalline rocks which extend to the coastal plain. No kaolins have been found in this crystalline belt. As in Georgia, the Potomac is the most important clay-bearing formation. It contains lenses of white clay that are worked near Columbia, Aiken, Sevier and at other points, and constitute a valuable resource to this State.

Tennessee.—A wide variety of clay is found in this State, ranging from ball clay to brick clay. No kaolin has been reported from Tennessee, though it may be looked for in the northeastern part of the State, as it is found in the adjoining regions of North Carolina. In a number of places in Eastern Tennessee are found residual clays suitable for brick and tile making. Some of the highly siliceous residual clays from the Knox dolomite are refractory, and fire-brick are made from them. Fire-clays occur in Fayette, Henry, Knox, Madison, Rhea and Weakley counties. In the Tertiary clays of Western Tennessee are found fire-clays which are used quite extensively in the manufacture of stoneware and fire-brick. The ball clays are also found in the western part of the State, in Henry county, and are mined quite extensively. Brick is also made in many places from the alluvial clays of the river valleys.

Texas.—Clays and shales are found in all parts of the State, but owing to the sparse population in the western portion of Texas and the lack of transportation little has been done in the way of studying the clays of that part of the State. A deposit of kaolin of the highest grade has been known for years as existing near Leakey, Edwards county, but owing to the distance from trans-

portation, between 40 and 50 miles, but little has been done with the material, notwithstanding its well known high quality.

In the eastern part of Texas, along the coast, there are clays corresponding with those of the Atlantic Coastal Plain. There is a strip of coast prairie region corresponding in age to the Columbia terrace deposits of the Northern States. In addition, there is a strip of littoral deposits along the coast which furnishes good brick at Houston and elsewhere. The Fayette formation occurs west of the coastal clays, extending from the Sabine to the Rio Grande, near Rio Grande City. The case of this formation is marked by clay beds of great thickness. They weather a pure white, and may prove of value in the manufacture of pottery, tile and brick. To the westward of and lying beneath the Fayette clay beds lies the Eocene formation, which contains clay bands varying from an inch to a foot or two in thickness, and of irregular extent. These clays are white and plastic, and are most abundant near the base of the formation, and are especially abundant in Cherokee, Henderson, Marion, Van Zant and other counties in Northeastern Texas. In Northern Texas shales of the Carboniferous are used for building and paving brick and pottery. The clays and marls of the Upper Cretaceous are used at Cooper, Corsicana, Dallas, Denton, Ferris, Greenville, Paris, Sherman, Taylor and Waco. Shales are found in Webb county in connection with the Eocene coal, and some of those found at Cannel are weathered and shipped to Laredo for making brick. Lignitic Tertiary clays are worked at Rockdale for dry pressed brick and stoneware, fire-brick and sewer pipe.

Virginia.—The coastal plain contains the most important clays of the State. Its geologic conditions are similar to those of the coastal plain in Maryland. The clays of the Columbia formation are used extensively for brick-making across the Potomac River to supply Washington and at other points. The Chesapeake formation, which is cut into by the Rappahannock, Mattaponi, Pamunkey and James rivers also contains clays suitable for pottery and brick-making. Kaolin occurs in Henry and Patrick counties and elsewhere, but none is now produced in Virginia. A clay showing an analysis closely resembling kaolin is reported to occur near Sherando, near Waynesboro, in the alluvial lands between Back Creek and the South Fork of the Shenandoah River.

West Virginia.—The clays of West Virginia, with the exception of a few river and lake deposits, are all in the older geologic formation. Among the most important clays of the State are those of the Carboniferous, which include the shales and fire-clays of the Pottsville, Allegheny, Conemaugh and Monongahela series, contains the Mount Savage fire-clay, which is worked at Piedmont. The Allegheny series contains the Kittanning coals and clays, the most important of which are the Lower Kittanning and the Bolivar fire-clays. The Lower Kittanning clays have been worked for fire-brick, paving brick and sewer pipe in Hancock and Taylor counties. The Conemaugh series contains shales and fire-clays, which have been used for paving and fire-brick at Thornton, Taylor county. Clays of this series are found at or near Charleston, and at other points in Kanawha county and at Morgantown, Monongalia county. At Huntington and other points in Cabell county the shales and clays are suitable for a variety of purposes, one of which is roofing tile. The Monongahela series contains shale, which is worked at Clarksburg, Harrison county; Spilman, Mason county, and Moundsville, Marshall county. The Dunkard or Permian-Carboniferous series includes a belt along the Ohio River that contains shales and clays suitable for clayworking, but have been used only near Parkersburg for roofing tile.

The recent clays are used at a number of places in the valleys of the Ohio and Potomac rivers for building brick. The clay industries of West Virginia, owing to the high character of its clays, its abundance of fuel and nearness to the principal markets of the country, seem to have a bright future.

An important and growing branch of the clay-mining industry is that of the production of fuller's earth. This is almost exclusively a Southern industry today, and the prospects for its expansion are bright. Of the eight States reporting fuller's earth for 1910, five were in the South. These five States reported 97 per cent. of the quantity mined in that year and 95 per cent. of the value. The history of fuller's earth in this country is the history of its development in the South. It was discovered in this country in 1893 by accident at Quincy, Fla., on the property of the Owl Cigar Co. In an effort to burn brick on the property of this company, which was a failure, an Alsatian cigarmaker called attention to the close resemblance of this clay to the German fuller's earth. As a result of this suggestion, the clay was tested and found to be fuller's earth, and the industry was developed. In consequence of this discovery there was considerable excitement and supposed fuller's earth deposits were reported from a number of States. But the South has easily maintained supremacy as the portion of the country where this material is most largely produced. Since the discovery of fuller's earth in Florida that State has been the leading producer. It is known to exist in the following Southern States, those in black being producers in 1910: Alabama, Arkansas, Florida, Georgia, Missouri, South Carolina, Texas and Virginia.

The great development of the petroleum industry is no doubt responsible for the interest recently manifested in this industry, and will no doubt result not only in the discovery of new deposits, but will cause some plants that are now idle to begin operations. In Texas prospects seem bright for the development of the industry, as there are a number of deposits known that give promise of becoming sources of supply.

Optimistic as to Future

By JAMES INGLIS, President American Blower Co., Detroit, Mich.

As to the future development of the South I have a feeling that during the coming years we are going to note both to the north and south of us, that is, in Canada and the Southern States, a most remarkable development. I do not think it is possible for anyone to have business connections in the South, or to be even slightly familiar with what has been accomplished during the past few years, to be anything other than optimistic as to the future.

Vast Storehouse of Fuel in Southern Petroleum and Natural Gas

By DR. DAVID T. DAY of the United States Geological Survey.



THE Southern States have produced 606,598,971 barrels, or over 80,000,000 short tons of oil, and 890,414,984,000 cubic feet, or six cubic miles, or 21,000,000 tons of natural gas, thus far since those fuel substances were first noted by General George Washington in what is now West Virginia in the latter part of the eighteenth century, and in Kentucky by other pioneers at about the same time.

Ever since oil production became an industry it has been a feature of Southern progress. It was the example of West Virginia no less than that of Pennsylvania in the old days that started well-drilling in Ohio, and similarly in the first year of this century Texas gave great impetus to the oil trade by the sensational wells at Spindletop, Texas, and over the line in Louisiana. Resulting from this oil wells have been drilled successfully in many places in the Gulf region of Louisiana and Texas, and judging by the unending list of "suns" of oil over Texas, more pools will be discovered as they are needed. The cheapness of this oil tempted the railroads to adopt it, and now it is used generally by them in place of coal.

The discoveries of oil pools in the South have been more or less accidental up to this time, and inasmuch as the future supply must depend largely on further discoveries, it is well to look forward as to the prospects of such new developments and to see what markets may be depended upon, and in general as to the influence which oil may be expected to effect in the future.

Two-thirds of the South's oil product is refined for various products, and one-third is used for fuel. From most of the latter third, also, the gasoline is "topped" off before the oil goes into the fire.

The chief products obtained from Southern oils have been: Gasoline, about 12 per cent.; kerosene of various qualities, say 40 per cent.; lubricating oils, about 3 per cent.; fuel oils, about 30 per cent.; paraffin wax, about 1 per cent.; while the remaining 14 per cent. comprises road oils, vaseline, petroleum coke, roofers' wax and loss in distillation.

These products are all worth more per unit than the natural crude, though they vary in value among themselves from about one dollar a gallon for exceptional lubricating oils to a fraction of a cent a pound for coke. But the market for some of these products is fully supplied, or over supplied; while for others the amount which the crude oil now yields stops far short of the demand. Any grade of gasoline which can be used in an automobile has more than ready sale, while kerosene is no longer so valuable a constituent as it once was. Far more lubricating oils could be manufactured from the heavy constituents than could be utilized, and fuel oil is always a drug on the market. It is no wonder, therefore, that variations in refining processes are sought eagerly, so as to change the proportions of the products that may be secured from the available crude oils. Much has been accomplished in this direction in contrast with the conditions in the early days of petroleum, when everyone believed that the refiner must be contented with simply what the oil was shown to yield. Even in the early days, however, it was discovered that the heavier constituents of crude oils could be broken up into light products, and thus the yield of gasoline and kerosene could be increased very markedly, although these "cracked" products were not so good as the "water white" oils contained naturally in the crude. Still they give good light and will pay for the cost of manufacture. Further, it was found that in the heavier oils distilled over by this second stage of the treatment of oils comparatively large yields of paraffin wax were obtained. This wax was well crystallized and of satisfactorily high melting point.

Next, it was found that the lubricating oils accompanying this paraffin wax, and from which the wax is separated by chilling and pressure, are superior lubricants, so that the advent of the "cracking" process among petroleum refiners made possible such changes in the distillation methods as to furnish a greater variety of burning oils and gasoline. But it also pointed the way to manipulating crude oils in the process of treating them so as to give greater yields of the products most desired by the market. There are few industries so flexible as oil refining, and the outlook is for closer modification of the products to the exact needs of the market. Meantime, the trend of invention is towards even greater flexibility, with the promise of processes by which any desired proportion of products may be obtained from any crude.

In regard to these needs for the various products, one may readily predict that the demand for gasoline will be on the increase for many years, for there is no adequate supply of a substitute for this fuel for the ever-increasing automobile consumption. It is true that the tendency of invention in internal combustion engines is towards the use of lower grade gasoline, and even kerosene, but the fear of mishaps to the motors tends to keep the higher priced gasoline in steady use, because the total difference in cost between high and low-grade gasoline is nothing compared to the inconvenience of an injury to the engines.

Therefore, every effort will be made to extend the supply of gasoline in proportion to its great market—automobilism—and with what success?

Will the gasoline supply be adequate? The answer is "yes," with reasonable certainty, for increased yield is progressing as fast as the demand, and it pays to extract the gasoline from the crude oil which is to be used as fuel, because the resulting fuel oil is better. The two fuels work better when apart, the volatile portion for internal combustion in delicate engines of the automobile or motor boat type, and the heavy fuel oil for combustion under boilers. But the favorable answer to the above question is rendered much nearer

certainly by the extraction of gasoline vapors from the natural gas from oil wells, about which more will be said later on.

As to kerosene, the outlook for a satisfactory market is not so good at first sight. Beyond reasonable doubt the future supply of kerosene will be bountiful. It is the question of demand which gives room for speculation. Against it is the ever-increasing popularity of electricity and gas for illumination. Both cater to the ease-loving public. Just as gas is easier to light than an oil lamp, and therefore more popular than oil, so electric illumination gives less trouble than gas. It may be that illuminating gas is doomed, partly for the reason given above, but chiefly because of the insidious danger to health of mere traces of carbon monoxide in the air due to gas leakage.

Now as to oil. Is the case as serious? I think not. Oil light is by far the cheapest. Aside from this compelling factor in continuing its use, there are others still more important. Few perhaps have noted a recent invention by which kerosene is carried from light to light in a tube smaller than the average electric light wire. It is burned in an incandescent mantle, and the illumination is perfect. No light has ever proved as easy for eyes as that from an oil lamp.

Again, the advances in automatic devices by which gas can be turned on and lighted at the same time may soon be applied equally well to the new oil light.

No one need be surprised soon to find their light supplied by oil flowing as smoothly through the interior of a hollow wire as the electric fluid flows over the outside—and with no need for insulation to render the wire harmless.

Beside this projected improvement in oil distribution, the fact must be reckoned with that oil refining processes are rapidly improving. The production of oils with no objectionable odor whatever is merely a matter of price, and the price is diminishing rapidly. If to absolutely insure the re-establishment of oil as a luxury light it should be necessary to make it play the role of perfumery, the means are very well known to the oil experts.

But to fasten these speculations as to the future to present facts, it is well to note that the writer saw Texas oil being supplied by just such capillary tubes to burners which give as fine illumination as could be found anywhere, although this was in a village in the Panhandle of Texas thirty-two miles from a railroad.

The demand is steadily increasing for mineral lubricating oils of all kinds, including those which oil a delicate watch or a sewing machine to light and heavy machinery oils, locomotive engine oils, car oils, suitable for hot or zero weather; marine engine oils, cylinder oils, oils for high-speed dynamos, for spindles in cotton mills, for the low temperature ice machines and for lubricating the hot cylinders of gas engines and automobiles, air compressors; oils for harnesses, for shoe leather, for softening wool for spinning and weaving, for increasing the pliability of fibers in rope-making, and for protective coatings against rust. All these and many more can be furnished in much greater quantity when desired. Fortunately, the demand for these high-grade oil products increases comparatively steadily, because it follows the growth of industries and has no considerable competitor.

Not nearly all the lubricants are made which the crude oils would yield. The processes are expensive, and rather than produce an over-supply, the excess of raw material goes in with fuel oils.

The future of the fuel oils involves the most significant development of all. The attention of the public has been repeatedly called to the increased fuel efficiency obtained by burning oil in place of coal under many special conditions, such as on railroads, and in general where the industries served are near the oil fields. But this industrial advance is trifling compared to the change which is rapidly taking place within the fuel oil industry itself. The change consisted at first in the gradual improvement of the burners by which oil was consumed under boilers, and also in the slight improvement in the character of the fuel oil itself when the lighter products were distilled off. But the greatest advance of recent years is the adoption of internal combustion engines, which can burn fuel oil instead of gasoline. For years even the crudest of Texas fuel oil has been burned here and there in this enlightened way, but lately the improvement in this practice has been rapid. The increased efficiency for fuel oils thus burned may be likened to the advantage of converting coal into fuel gas before burning it. This improvement alone will double the efficiency of oil in the South. And should the production decline, its fluctuations will be steadied by the great supplies of fuel oil in Mexico.

The enduring importance of oil is sufficiently evident in the future development of the South, both domestic and industrial. But the subject must not be dismissed without reference to another element of importance which is only beginning. No movement towards the South's development is more essential than the development of good roads. For this oil has become a necessity.

Asphaltum oils applied in the finishing of a macadam road will protect the surface from the wear of rapidly moving automobiles. Thus, from the gasoline, as the automobile's motive power, to the kerosene that lights its lamps, and the lubricating oils that keep it in motion, oil is necessary clear to the preservation of the road from the machine's abuse. It is only a fair illustration of the necessity of oil for all material progress, and fortunately the South is rich in this great element of advance—rich beyond the average

for the United States, even without reckoning stores, which, in all probability, wait upon enlightened search.

As to natural gas, the conditions are very different, and yet the outlook has also much of encouragement, for most of the known gas is in the South.

In West Virginia the production of natural gas may be expected to increase for a few years, and the present methods of collecting casing-head gas from the oil wells are so efficient that the inevitable decline will be very slow. In Kentucky as well as in Tennessee the outlook is for a decreasing supply. But in Oklahoma there is evidently a great supply that has not yet been touched, and the production can be greatly increased if the present waste can be controlled. Dr. Charles N. Gould, ex-Director of the Oklahoma Geological Survey, states in one of his recent bulletins that

"At a conservative estimate, not to exceed 25 per cent. of the gas so far discovered in Oklahoma is now being utilized. Part of it is shut in, but much of it is going to waste. It must be remembered, however, that only a relatively small per cent. of the oil and gas region of Oklahoma has ever been prospected, and a still smaller part developed. There is enough prospective territory untouched in Oklahoma to keep the drillers busy for the next fifty years. Counting fifty years more for the last well brought in, and assuming that the greater part of the gas will be utilized and not permitted to go to waste, we may approximate 100 years as the life of the oil and gas field of Oklahoma."

Louisiana's gas supply is problematic. Large supplies are evident at Caddo, and it must last for many years; but just how long is a matter of question because of the waste, and much of this waste is not easily avoided, if oil is to be produced, and it may be overestimated. One point is sure. The waste has deterred the investment of capital in this, the greatest field now known.

Meanwhile, the gas story of Louisiana is not told by mention of Caddo alone. There are many other likely regions in the State. Monroe has proved its gas supply; more may be expected in connection with many salt domes not yet exploited, and the region of Houma, on the Gulf coast, contains gas with heavy pressure, but under conditions which challenge the gas driller's skill.

Alabama has begun the exploitation of gas at Fayette, and small wells will also continue to yield gas for some time at Huntsville.

Southern Texas has not utilized the occasional gas pools as well as might have been expected from the industrial enterprise so manifest in the last few years, but gas in Northern Texas is an entirely different matter. The development of the Henrietta field in Clay county is familiar. It has been piped to Fort Worth, Dallas and Wichita Falls, and the supply seems ample. This is simply a good example of what may be expected in many regions of North Texas, in so far as the geological conditions promise.

In short, there are no signs of exhaustion in any Southern gas field, and much more could be utilized if the necessary outlet was afforded. For the present Southern gas needs more commercial outlets. Two large plans for using Caddo gas are lying dormant. One is the very ambitious scheme of piping it to St. Louis and supplying various cities en route, and the other plan is much more feasible. It contemplates a line to New Orleans. In both cases the situation is doubtless complicated by short-sighted interests that take an unfriendly view without grasping the enormous trade developments which must follow either project.

In favor of greater industrial use for Southern natural gas is the progress in large power units for electrical purposes offered by the modern gas engine. The initial cost of electricity from such generators is decreasing faster than it is by water-power installations, and the cost of upkeep is not unfavorable.

In considering the uses for natural gas emphasis must be given to the enterprise now so popular of extracting very light gasoline from the natural gas obtained from oil wells. Where the gas is not too dry, that is, yields two gallons or over of gasoline per thousand cubic feet, this enterprise is profitable. But in some cases the vapors rising from oil wells are not methane or real natural gas at all, but consist entirely of condensable vapors. Lately the National Bureau of Mines has studied the technical features of this natural gasoline, because the extreme volatility of this material has necessitated special precautions in handling it. The investigation has shown that the product should be transported in tanks that will stand considerable pressure. Now, the moment that this procedure was decided it became evident that still lighter vapors and dry gas itself could be pumped into the heavier gasoline, and thus is brought about virtually the transportation under pressure of gas, and vapors that can be used as gas, for heat and light purposes to any distance, and the products can be stored indefinitely. This will develop a new supply of gas for car lighting, for dwellings, automobiles, and in short offers a large supply of cheap gas with no need for pipe line installation. Further, the gas has no poisonous properties whatever.

It seems clear from the above facts that the demand for both petroleum and natural gas bids fair to continue as good in the next thirty years as it has in the past. The supply of both is equally satisfactory, especially if they can be utilized at home and not exported. Even in the crude state they mean, taken together, a total revenue of millions of dollars a year. They have already developed manufacturing industries in Texas and elsewhere for drilling machinery, and once started these steel manufacturing establishments are branching out into the production of many other steel implements. One can see not only shops for the repair of steel tank cars, but new ones being manufactured at Port Arthur, Texas, and at Baton Rouge, Louisiana.

But, after all, oil and gas are, even more than coal, only the raw materials for other industries. Oil in its humblest uses is the handmaid of the railroad and gives the best finish to the wagon road. It is the very essence of the automobile and plays an essential part in every factory.

As to gas, it is as a fuel a fortunate combination of the cheapest and the best, and it must for many years be the beacon-light which will call industrial plants to the Southland.

The Outlook in Cement

By CHARLES CATLETT of Staunton, Va.

A number of years ago I pointed out, in the columns of the MANUFACTURERS RECORD, the enormous growth of the cement industry and the fact that as Portland cement had, to a considerable extent, to take the place of lumber and supplement and protect our supply of ore, its production and consumption must largely increase. I ventured the prediction that this increase would be as great as to be one of the most striking things in connection with our general industrial development. This statement has been fully confirmed, and it is the more remarkable that, while the consumption of cement has, of course, been affected by the ebb and flow of business prosperity, yet there has never been a year in the last 20, unless it is possibly the present one, when the consumption of Portland cement did not show a large increase over the previous year. Yet within that 20 years there have been a number of times when iron, the recognized barometer of trade, has shown reductions. We have often been able to get along with less iron, but we have always wanted more cement.

While it remains to be seen whether we have approached the saturation point, and whether the production and consumption will advance in a more orderly fashion and respond more promptly to industrial changes, in the same way as iron and coal, it is very clear that we are but at the beginning of the yearly consumption in this country. As great as is the present consumption, it will sink into insignificance when the farmers of the country get into the habit of taking home a few bags of cement every time they come to town and when the use of cement in some form will be considered a necessity on every farm. This is inevitable, and the dissemination of knowledge as to how to use Portland cement will soon be general, and the valuable and fascinating part of it is that every user is a manufacturer. The ordinary user of iron buys it in its finished form because the difficulty of working requires special appliances and skill. The ordinary user of cement buys it in a package which permits of indefinite subdivision, and on mixing it with sand and water and gravel, all of which are more or less generally distributed, he makes a post, or a tank, or a boat, or a house. It is no wonder that under the spell of it all it should have been tried in some cases where it was not suited, and the most astonishing thing is that it has failed so little with such unskilled handling.

There is no question as to the large increase in consumption which will take place in the next few years, but whether the industry shall prove a profitable one on the whole is uncertain. It is certain that a great deal of cement is now being sold in the South at less than the cost of production in order to keep the mills busy, and it is certain that the best mills are getting an inadequate return. This is in part due to the general depression affecting all business, and with return prosperity the prices must increase somewhat; but the tendency is to reduce the average price, and is different from iron. With the gradual consumption of the better ores and the recognition of their limitations, the tendency of the average of iron prices is upward.

While the price of cement will certainly go up with changed business conditions, the average price in the future may be expected to be less than the average price in the past, partly because of improvements in plants and in methods, and partly because the development of local plants near to points of consumption will both lessen the freight rate to the consumer and continually reduce the zone of profitable distribution from existing plants. This, then, is followed by an effort to reduce cost by increasing output, and as all of the companies go through the same process at the same time, there is a steady tendency for the production to keep ahead of the consumption. The wide distribution of cement material makes it impossible to imagine such a thing as the control of the supply, and the minute prices get very high competition will rush in. But the places which combine conditions for cheap production, good quality and a good market are limited, as anyone will find out who carefully investigates them.

There will be a great many plans for cement construction in the South in the next few years, and those readers of the MANUFACTURERS RECORD who are interested in the subject may save themselves some money by cutting out the following suggestions and pasting in their hats:

Be certain as to the amount of the material. A cement plant to be successful must work on a large scale.

Be certain as to the amount of your money. The plant should be started on a comparatively small scale, say \$500,000, in order to try out the market, but this should be rapidly enlarged for cheap output.

Be certain of the quality of your raw material. You can make bad cement out of good material, but you cannot make good cement out of poor material.

Be certain of your market—first, as to its extent, then its stability, then its price. In most markets the starting of a new plant, with its large production to be absorbed, will, by its own weight, reduce the market price, and, if the power of absorption is small, may destroy all profit.

Be certain that the expense incidental to finding the best way to handle your special material and market it will cause your cement to cost more than at older plants supplying the same market, even if you have greater natural advantages. This high cost will continue for a long time after your plant is started.

Be certain to distrust very high profits. They are probably not true. If true, they are temporary.

Go South Instead of West

By Mr. R. D. Wood of R. D. Wood & Co., Philadelphia, Pa.

My own impression is that the young men of our country would do better in going South rather than West.

The opportunities for growth and expansion seem to me more open in the Southern States than anywhere else, except in the largest centers of the country.

Fuller's Earth in the South

By F. B. VAN HORN, Geologist, U. S. Geological Survey.*



Fuller's earth is a substance about which comparatively little is known except that it is a clay which acts as a clarifying agent for mineral and vegetable oils. Numerous theories have been advanced to account for its action, but beyond the fact it is due to strong absorbent properties, not much has been developed.

Dana defines fuller's earth as including many kinds of "unctuous clays, gray to dark green in color, and being in part kaolin and in part the mineral smectite." It is placed by him with several clay-like minerals (all of them hydrous silicates), namely, smectite and malthacite, of not very definite composition, but all having a high percentage of combined water. It is inferred that Dana considers these minerals the cause of the bleaching power of fuller's earth.

Ries defines fuller's earth as a clay-like substance that has the property of decolorizing or clarifying oils. He says: "An ultimate chemical analysis shows it to differ from most ordinary clays in having usually a high percentage of combined water and a low amount of alumina. There is probably a large amount of hydrous silica present. Fuller's earth possesses little or no plasticity, and in order to work properly has to be ground very fine. A chemical analysis is of little value at present in determining its quality; only a practical test suffices."

Geike defines fuller's earth as "a greenish or brownish, earthy, soft, somewhat unctuous substance, with a shining streak, which does not become plastic with water, but crumbles down into mud. It is a hydrous aluminum silicate with some magnesia, iron oxide and soda." According to Geike fuller's earth owes its detergent properties to physical characteristics rather than to chemical composition.

John T. Porter, in an article on the "Properties and tests of fuller's earth," presents a very interesting theory. He says that it is evident that Dana's theory will not stand, since the discovery of American deposits having a comparatively low percentage of combined water. Such earths could not possibly have as their base either smectite or malthacite, although they might contain very small quantities of these minerals.

Porter says that his analysis have confirmed Ries' statement that fuller's earth contains appreciable amounts of hydrous silica. However, it is evident that if the bleaching power of fuller's earth is due to this hydrous silica, treatment of the earth with boiling carbonate of hydrate of soda, which removes the silica, should destroy this bleaching power. He has tried this experiment on several earths, and although the results are not entirely concordant, yet there can be no doubt that fuller's earth retains at least a part of its efficiency after treatment by alkalis. It is also plain that carbonate of soda has a much less harmful action on the earth than the hydrate. As Fresenius and other authorities state that hydrous and amorphous silica are freely soluble in hot carbonate of soda, as well as in sodium hydrate, this difference can hardly be due to partial decomposition of the earth by sodium hydrate. In this connection he noticed that sodium hydrate appears to extract considerable alumina as well as silica, but the carbonate does not. Fuller's earth after treatment with sodium hydrate is left in a very gelatinous condition and is extremely hard to filter and wash. For this reason it is possible that some of the samples treated retained considerable amounts of soluble salts after washing, although great pains were taken to remove them, and this may have had some influence on the results.

Another fact which might be used as an argument against this theory is that hydrous silica artificially prepared has but very slight bleaching powers. These results are naturally not conclusive, as the silicic acid occurring naturally may differ either physically or chemically, or both, from the artificial product.

On the other hand, some earths still retain a considerable portion of their bleaching power after decomposition by acids, consisting then of 80 per cent. or more of silica; and from this it seems probable that hydrous silica when prepared in certain ways may have some small efficiency.

Porter says, in conclusion, that he thinks he is justified in stating, first, that hydrous silica does not of itself possess bleaching power, although it may at times possess some efficiency as a result of existing in a certain physical condition; and second, that it is certain that fuller's earth can not owe more than a small part of its peculiar properties to the presence of free silicic acid.

Porter offers a new theory to explain the clarifying action of fuller's earth. It is based on the presence of a group of aluminum hydrosilicates existing in the form of pectoids.

The theory which he has devised to explain the peculiar properties of fuller's earth may be stated as follows:

1. Fuller's earth has for its base a series of hydrous aluminum silicates.
2. These silicates differ in chemical composition.
3. They are, however, similar in that they all possess an amorphous colloidal structure.
4. The colloidal structure is of a rather persistent form and is not lost on drying at a temperature of 130° C., or possibly higher.
5. These colloidal silicates possess the power of absorbing and retaining organic coloring matter, thus bleaching oils and fats.

In this statement Porter used the word colloidal in its broadest sense—to cover the whole range of conditions expressed by the words colloid, pectoid, and hydrogel. It is his opinion that the word pectoid would most properly express the condition of the active constituents of fuller's earth, but it is not

impossible that these may go into partial solution in oil and thus become true colloids.

Colloids possess the power of taking up organic colors from solution and the analogy with fuller's earth is so apparent as to excite surprise that it has not been studied with this idea in mind before. It has even been known that pectoids could extract colors from oils and resins as well as aqueous solutions. Porter regards this as a strong point in favor of the colloidal theory, although by itself it does not, of course, constitute proof.

The power of colloids to absorb certain salts, or at least the basic ions of these salts, has been known a long time. This power is also possessed to a degree by certain amorphous substances having a fine porous structure, such as charcoal and boneblack. Fuller's earth has this property to a marked degree. In fact, its use has been proposed to remove the lime from boiling water. Porter has found that after it has absorbed ammonia or salts it loses a great part of its efficiency in bleaching oils. From this he infers that it absorbs the bases in the manner in which it absorbs the coloring matter of oil, the bases occupying pores which otherwise would hold the color.

It has been pointed out that these absorbent materials have a selective action on the salts, absorbing the unlike ions and discarding the ions of like chemical nature. If colors in oil solution are absorbed in the same manner as salts in aqueous solution, analogy would lead to the supposition that fuller's earth would exert a selective action for certain classes of coloring matter, and, moreover, that the earths themselves would differ in their selection of colors according as they are more or less acidic in composition. This is stated to be in accordance with the facts.

In the course of his oil tests Porter noticed that on the same sample of oil different materials give products varying greatly in shade, the main color in some tests being of a yellow and in others of a green tint. Is it not likely that the oil contains several compounds of varying chemical nature, and that the earths or other materials used in bleaching extract them in ratios proportional to their own basicity or acidity? He has been unable to obtain any exact data on this point from his results, owing to the difficulty of following these slight changes in tint with the unaided eye. A tintometer would be needed if this line of investigation were to be followed out.

Until 1893 all the fuller's earth used in this country was imported, but in that year a deposit of the material was found at Quincy, Florida. At the present time practically all the home production comes from the Southern States. In 1910 Florida ranked first in production, Georgia second, Arkansas third, Texas fourth and South Carolina seventh. The only other States which produced fuller's earth in 1910 were California, Massachusetts and Colorado, and in these States only a small quantity was mined.

Arkansas was the second Southern State to produce fuller's earth, a small quantity was mined in 1901. In 1904 Alabama reported production, and in 1907 Georgia, South Carolina and Texas entered the list. Florida, however, produces about 60 per cent of the total quantity mined in the United States.

USES.

The principal use of fuller's earth in this country is the bleaching, clarifying, or filtering of fats, greases and oils. The common practice with mineral oils is to dry the earth carefully, after it has been ground to 60 mesh or finer, and run it into long cylinders, through which the crude oils are allowed to percolate very slowly. As a result, the oil that first comes out is perfectly water white, and much thinner than that which follows. The oil is allowed to continue percolating through the earth until the color reaches a certain maximum shade.

With the vegetable oils, the process is radically different. The oil is heated beyond the boiling point of water in large tanks; from 5 to 10 per cent. of its weight of fuller's earth is then added and the mixture is vigorously stirred and then filtered off through the bag filters. The coloring matter remains with the earth, the filtered oil being of a very pale straw color, provided the operation has been conducted with sufficient care.

Fuller's earth is said to be used in the manufacture of some soaps. It is also used in cleaning furs, and by druggists as an absorbent.

Methods of Mining.—Sellards, in the Second Annual Report of the Florida Geological Survey, described the methods of mining in that State. He says that originally the overburden in the Florida fuller's earth mines was removed by pick and shovel. At the present time, however, the overburden is removed chiefly by steam power. The depth of overburden that can be profitably removed is determined entirely by the depth and character of the fuller's earth deposit. The overburden removed in the mines which are now being worked varies from one or two to 12 or 14 feet. The greater part of this overburden is more or less decayed and residual in character and is readily removed. With some of the harder material, loosening by blasting becomes necessary. It is of interest to note that the fuller's earth when protected by a great thickness of overburden sometimes contains irregularly distributed and residual masses of an impure limestone. This was noticed in particular in the fuller's earth mines at Quincy. At this place it was found that when in working back into the hill the overburden reached a thickness of 12 to 14 feet, the fuller's earth stratum contains irregular residual masses becoming more and more abundant until with an overburden of about 14 feet the pit was abandoned.

The fuller's earth itself is mined in the open pit by pick and shovel, being loosened when necessary by blasting. From the pit it is loaded by shovel into "dummy" cars and is drawn either by cable or by small engine to the plant nearby.

At the plant the fuller's earth is taken to the store house. The larger

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pieces are broken by pick and sledge and the material then passed through a crusher. After passing through the crusher, the material, now broken into pieces, one or two or three inches in size, is fed automatically into a drying cylinder. These cylinders, which are 30 or 40 feet long and five or six inches in diameter, revolve slowly and, by means of half cups set at an incline, move the fuller's earth forward with each revolution. A high temperature is not sought in the cylinder as used in Florida, the object being to remove the surface moisture from the clay. The fuller's earth passes through the cylinder at the rate of possibly one ton an hour, each piece of clay occupying 15 to 20 minutes in transit. The fuller's earth upon dropping from the cylinders after drying is carried to a storage bin, and is there fed to the mills for grinding as needed. Two kinds of mills are in use. One of these consists of a horizontally revolving cylinder in which the earth is ground fine by a gravity ball. From this mill the ground fuller's earth is carried to a jig which separates the earth into two grades of fineness. The second kind of mill, which is perhaps the mill most frequently used, grinds and delivers the earth in mixed grades. The ground material in this case is passed through bolters and separated into the grades desired for commercial purposes. After bolting, the earth is sacked for shipment and is labeled according to the degree of fineness. The grade most used in refining mineral oils is about 30-60, by which is meant fuller's earth ground to a fineness which permits it to pass through a 30-mesh screen but not sufficient to permit it to pass a 60-mesh screen. The finer grades find other uses.

The following table shows the production of fuller's earth in the United States from the inception of the industry:

Production of fuller's earth in the United States, 1895-1910.

Year.	Quantity.	Value.	Average price per ton.	Year.	Quantity.	Value.	Average price per ton.
1895.....	6,900	\$41,400	\$6 00	1903.....	20,693	\$190,277	\$9 20
1896.....	9,872	50,360	6 01	1904.....	20,480	168,500	8 22
1897.....	17,113	112,272	6 56	1905.....	25,178	214,497	8 52
1898.....	14,860	106,500	7 17	1906.....	32,040	265,400	8 28
1899.....	12,381	79,644	6 43	1907.....	32,851	291,773	8 88
1900.....	9,698	67,535	6 96	1908.....	29,714	278,367	9 37
1901.....	14,112	96,835	6 86	1909.....	33,486	301,604	9 01
1902.....	11,492	98,144	8 54	1910.....	32,822	293,700	8 95

The following table shows the production of fuller's earth in 1910, by States:

Production of fuller's earth in the United States in 1910, by States, in short tons.

State.	Number of operating producers reporting.	Quantity.	Value.	Average price per ton.
Arkansas.....	4	2,563	\$29,137	\$11 37
California and Colorado.....	3	568	8,085	.....
Florida.....	3	18,832	170,267	9 04
Georgia, Massachusetts and South Carolina..	4	9,995	77,638	.....
Texas.....	3	864	8,582	9 93
Total.....	17	32,822	\$293,700	\$8 95

This table shows that Florida was the leading producing State in 1910, and reported 57.38 per cent. of the quantity and 57.97 per cent. of the value of the total production. The other States in the order of their rank in output and

value in 1910 were as follows: Georgia, Arkansas, Texas, California, Massachusetts, South Carolina and Colorado. The average price per ton in the States combined in the table was as follows: California, \$15.79; Colorado, \$9.93; Georgia, \$7.79; Massachusetts, \$7.14; South Carolina, \$8.00.

During 1910 there were imported into the United States 16,857 short tons of fuller's earth, having a value of \$132,545, or \$7.85 per ton. It will be seen by comparison with the above table that about one-third of the fuller's earth used in this country must be imported. The comparatively high price which the material brings, makes it highly desirable that further search be carried on for deposits of a good grade of fuller's earth which will compete in quality with the imported article.

The high price of fuller's earth as compared with that of other clays brings many requests for information as to how to distinguish fuller's earth from kaolin, etc. This is no easy question to answer and yet when actually sold the fuller's earth is most exactly graded as to quality.

As already indicated in this article fuller's earth is a clay unusually rich in silica and water of hydration. But it is its porosity of a peculiar kind that makes fuller's earth valuable. Any clay which possesses this peculiar porosity will go as fuller's earth and sell higher or lower according as it has more or less of it. But simply being porous will not answer. For example, infusorial earth (not a clay at all) is so porous that it is used for filtering water, and even for blotters in place of paper. But it has no value whatsoever as fuller's earth. The pores are many but coarse. They will not catch and hold back the impurities in oils as is required. Therefore the clay supposed to be fuller's earth is usually first tested for any kind of porosity—by touching a dry sample to the tongue. If very porous it will, of course, adhere. Next to determine whether the sample has the right kind of porosity. For this there is simply the test of actual use. To test the clay's usefulness for filtering lubricating oils, a pound is heated to incipient redness. This is placed in a narrow tin funnel say six inches high and three wide at the top and half an inch at the bottom. Onto the clay a standard dark lubricating oil is allowed to fall drop by drop, and the amount of oil is noted that drops from the funnel before the color becomes darker than a standard grade of light colored, filtered lubricating oil.

For clarifying animal and vegetable oils the procedure is different and again follows the trade practice. A pint of oil—crude, refined cotton oil for example—is heated to a given temperature say 120° C. Into this is stirred a small amount of the clay after drying as before, and sieving through a 120-mesh sieve. After continuous stirring for about 20 minutes the color of the oil (after settling, etc.) is compared with a standard. It should only have a very pale straw color.

In the writer's opinion, neither of these tests is very satisfactory. Lately my attention has been brought to a clay said to exist in large quantities in Texas, and to be of the highest class for oil clarifying. This clay does not feel very porous and is heavier than the ordinary varieties. It is much like a fuller's earth lately found to be of satisfactory quality in California.

A chocolate-brown deposit consisting chiefly of phosphate of alumina which decolorizes organic liquids surprisingly well, has been observed (but not utilized) in Florida. Various chemists connected with oil refineries, etc., have their own methods of testing fuller's earth, and these vary greatly among themselves as to their ideas of what is best in a fuller's earth. But any clay which is found by an expert to pass successfully the tests given above is worth sending to one of the fuller's earth consumers for a trial.

Future of the Naval Stores Industry

By R. M. MARTIN of Dublin, Ga.



THE naval stores industry will continue indefinitely to figure strongly in the future development of the South. The invention of metal cups that are rapidly replacing the destructive "boxing" system means that the lives of millions of pines have been saved for the future use of generations to come. In a word, a great conservation movement has taken hold of the turpentine industry, and where there was once wanton waste of the magnificent forests there is now the greatest care.

Thirty years ago it was freely predicted by wise ones that the industry would last but a few years at most. Yet in sections of the Carolinas and Georgia there are forests that have been worked continuously for more than fifty years. These forests were and are owned by persons who are natural conservationists. Their number is growing, so that now it is considered criminal to "box" trees for turpentine purposes.

With the growing demand for spirits and the even greater relative demand for rosin, the industry will continue to be fostered and encouraged over the entire belt which extends from the Carolinas, the lower half of Georgia, Alabama, Florida, Mississippi, Louisiana, the eastern half of Arkansas and Eastern Texas. It will, therefore, be seen at a glance that millions of capital will continue to be invested in the industry and that thousands of people will be employed in its manufacture and sale.

Of course, as time passes and the needs of the people for land for agricultural purposes becomes more acute, the forests will have to go. But even this is to be put off for a long period, for with the scientific agricultural methods now being adopted everywhere in the South one acre is now made to produce what five and even ten did just a few years back.

The corn club movement that has gained strong headway, and which has been made such a splendid success, has in the opinion of the writer done a world of good towards the retention of the forests of the South. Every other idea of this character and the wide discussion of the conservation movement have and are playing their part in keeping the forests intact.

What it has done in the way of providing the necessary capital for city building and the construction of other industries in the past will be continued in the future. It has been the source of capital which has built hundreds of industries in every section of the South. Its most marked effects have been felt in Savannah, Jacksonville, Tampa and Pensacola, where various institutions, including banks, mercantile houses, manufacturing concerns and hundreds of beautiful homes are built and maintained by turpentine money. Other smaller cities have their share of the good things brought to them with money from this source.

In the past, say twenty-five years ago, it was the custom of factors to finance operators who were themselves without capital, but who were experienced in the business. As the business grew this custom waned, so that now an operator must have at least as much capital as he desires to borrow. This has naturally brought about the era of the large operator. The business gets into fewer hands each year and naturally requires larger capital for the individual operator. The high price of mules, wagons, feed and other supplies, including labor, has put the small operator out of the industry. There is no room for him, and he has been retired through the changing circumstances brought about by the causes named. Another thing that has been potent in forcing his retirement has been the constantly increasing price of timber.

The use of cups has greatly reduced the proportionate production of rosin, while it has correspondingly increased the spirits output. The reason for this is not far to seek. Under the boxing plan much of the crude gum fell on the face of the tree and remained there for months, during which time it lost much of the spirits it originally contained. Under the cup system the crude gum falls directly in the receptacle and is soon afterwards distilled. This means that the lower grades of rosin are gradually disappearing, and in part

accounts for the prevailing high prices, the lowest grade being quoted at \$6.15 per 280 pounds, while the highest grade is quoted at \$7.85. The differences were greater before the use of the cup system became so general.

With the gradual movement of the industry to the West, it is expected that the naval stores headquarters or market will also move, but even this is questionable. Savannah has had the marketing and financing of this industry so long, and now has such a firm hold on the trade, that it will be difficult for

any other city to dislodge her. Still, for reasons of economy and not sentiment, it would appear that Mobile or New Orleans should in time take her place as the marketing point.

But in the opinion of the best informed there is good reason to believe that it will be many years before there need be any fear of a naval stores famine, and this reason is based mainly upon the spirit of conservation that has taken such a strong hold upon the whole country.

Possibilities of Railroad Expansion in the Southwest

By B. F. YOAKUM, Chairman of the Board, St. Louis & San Francisco Railroad Co.



It is comparatively easy to write about the performances of the past, and it is not hard to make predictions for the future, about a good many things; but it is difficult to make an estimate of what will be necessary in the way of additional railroad construction, additions and improvements in the Southwest in the near future.

The locality definition "In the Southwest" is somewhat vague, and for the purposes of this article, Missouri, Arkansas, Oklahoma, New Mexico, Louisiana and Texas—six States—are considered.

These six Southwestern States embrace an area of 629,848 square miles, or nearly one-fifth of the area of the United States.

The population in 1910 was 12,404,000, an increase of 64 per cent. in the preceding 20 years.

In 1910 these six States had 41,900 miles of railroad, or one mile of railroad for every 10,000 acres.

This density of railroad mileage is very small, when compared with older Northern States, as shown by the following:

Pennsylvania, one mile for every 2500 acres.

Ohio, one mile for every 2800 acres.

Indiana, one mile for every 3100 acres.

Illinois, one mile for every 3000 acres.

Iowa, one mile for every 3500 acres.

There is not one of the six Southwestern States that has as yet gotten out of the swaddling clothes of development. Missouri is the most advanced of them all, yet its resources are hardly prospected. It is rich in iron ores, and almost nothing has been done to utilize them. Its lead and zinc deposits have been, and are, very productive, but large areas yet await the miner. Its coal fields are partly developed, and the total amount of coal in the State, according to the Government figures, is 30 per cent. that of the entire State of Pennsylvania. Its agricultural resources, particularly in the southeast quarter of the State, are wonderful, but mostly undeveloped. The overflow part of the State, lying in the extreme southeastern corner, containing 1,900,000 acres, has in the past few years been the scene of considerable drainage activity, and is coming into prominence very fast. Lands that changed hands at \$5.00 or less an acre, now that they are drained and cleared, are selling at from \$100 to \$150, and although the benefits of drainage are only beginning to be realized, the population in this part of Missouri increased 40 per cent. in the last six years.

What Missouri has done in drainage work has attracted universal attention. It is the first thought at the present time of all of the people of the Mississippi Valley, and well it should be, for there are over 25,000,000 acres of similar land lying along the Mississippi River, on both sides, between Cape Girardeau, Missouri, and the mouth of the river, awaiting the drainage dredge to bring this immense body of forgotten land—as rich as any in the world—under cultivation.

Of the 25,000,000 acres, 17,000,000 are located in Missouri, Arkansas and Louisiana. Divided into 40-acre farms, these 25,000,000 acres would furnish farms to 625,000 farmers, and thereby provide homes and competence for 3,000,000 people; not to speak of the population of the cities that the heavy production from these deep alluvial soils would create and support. It is almost too conservative to place the average product of these drained lands at \$40 per acre, yet at this figure the yearly crop would bring \$1,000,000,000.

The State of Arkansas is very similar to Missouri in its mineral resources, except that they are practically all undeveloped. It has 5,760,000 acres of overflow lands, upon which little has as yet been done in the way of drainage; but as in the case of Missouri, this work is fast becoming a fixed policy, and the diversity of crops which can be raised in Arkansas will make these lands very attractive and valuable.

Louisiana has also begun to drain and make available for cultivation the great area of overflow land in that State, which amounts to 9,600,000 acres. The cultivation of these rich, alluvial soils in this State will produce exceptionally large crops. The example of the Bayou Teche district, lying west of the mouth of the Mississippi, which has long been pointed to as a marvel in the value of crops raised, has commenced to be followed in all parts of the State. The rice fields of Louisiana are growing very fast, and the State already grows more than one-half of the rice produced in the United States. There are 300,000 acres planted in sugar cane in Louisiana.

Oklahoma is already an empire in itself, yet of the 44,324,160 acres of land, only 10,000,000 acres are in cultivation. Oklahoma is the home of all the crops. It is a land of diversification: a land of agricultural independence. There is no more need for experimenting in Oklahoma. It has passed the prospecting stage, and while there are boundless opportunities for agricultural development,

there are also illimitable opportunities for other business undertakings. Oklahoma has a considerable area of coal land, and its oil lands are the greatest in the United States; and new discoveries in this direction are being made as fast as wells can be put down. In 1909, Oklahoma produced 26 per cent. of the total oil production of the United States. Along with the oil comes gas, and manufacturing institutions are just commencing to take advantage of the cheap fuel and raw materials available in this young State.

The dreaded "Llano Estacado" or staked plain, lying in Eastern New Mexico and Northwestern Texas, is just being prospected by the farmer, and they are finding water at exceedingly shallow depths, in a land which was always looked upon as being dry and arid. These agricultural pioneers have followed the railroads into that region, and are showing the so-called desert to be a farming country. The shallow well and gasoline engine as a new, independent medium for furnishing an irrigation supply is going to be in common use throughout all that region, where water can be found at a reasonable depth. The waters of the great Southwest plains are under the ground instead of on top, and a way has been found to raise the waters to the surface. The flood waters of the water courses of the great valleys in Oklahoma, Texas and New Mexico will all be stored and utilized on the lands which are now dry and fallow, but rich and ready for the plow.

In Oklahoma attention is just beginning to be turned towards irrigation. In Texas, in the last ten years, the acreage under irrigation projects, either completed or under construction, increased from about 450,000 to 1,253,000 acres; of which latter acreage, however, only 451,000 acres are as yet being tilled. Almost all of the irrigation being done in Texas is by means of water derived from streams. Eighty-three per cent. comes from that source, the balance being supplied by wells, springs and lakes. Only 1½ per cent. of the irrigation was done from reservoirs, so that there is ample room for an increase in acreage from storage reservoirs, and from shallow well pumping. The Frisco now has expert engineers in the Gulf coast country investigating the underground water supply in the vicinity of Kingsville, Texas, to be used for irrigating by electric power pumping.

One of the best examples of how quickly the Southwest will respond in population and development to the building of a railroad is evidenced by the Gulf coast country of Texas: that great area, half as large again as the State of Indiana, reaching south from Orange, Beaumont and Houston, along the Gulf, to the Rio Grande; it is less than five years since the Frisco System completed its line from New Orleans to Brownsville, Texas. When this railroad was started, the land was owned by cattlemen. These cattle barons owned domains some of them equal in size to an entire New England State. Today these great ranches are being cut up into small farms; verdant fields are beginning to occupy the acres where cattle roamed but a short while ago; factories are arising along the railroad. Immense irrigation projects have been and are being developed. One thousand one hundred and thirty-two miles of main irrigation canals, representing an investment of \$20,000,000, have been constructed; cotton gins, sugar mills, canning factories, and industries of all descriptions are going up, and settlers are pouring in from all over the United States, and many from other countries. This development is not one which invites the farmer with his entire possessions packed in a prairie schooner. The settlers who are flocking into this region are men with some means; men who have been successes in their former homes, and who are selling their farms in older countries and seeking new and richer ones. They are clearing and cultivating the lands, building cities, and in every way exerting a most potent influence in the substantial upbuilding of the country. You will find among them farmers from the great corn countries; from the cotton and rich growing sections of the South; from the sugar cane belts of Louisiana; from the orange, truck and fig growing districts of Florida and California. All alike find in this territory conditions most favorable for the growth of any and all of these crops. They find it possible to grow a wider range of crops in this section than anywhere else in the United States. One crop follows another, and it is simply a question of the energy of the farmer as to the revenue which he can produce from his acres. It is the country of continuous crops. There is not a month in the year in which some crop is not ready for the market. The land is still low in price, but is steadily increasing in value, and it will not be many years before a great deal of it will bring as high prices as the orange lands of California, or the apple lands of Oregon and Washington. The value of the products will justify and command that price for the land, and it is only because there is still plenty of vacant land that the price remains low. In the last five years the assessed taxable value of the property traversed by the Frisco's Gulf line has increased more than \$62,000,000, and the population has increased over 48 per cent. This section of the Gulf Coast, as well as that

lying east of Houston and along the Gulf of Florida, has long attracted the sportsman, and now that magnificent hotels are being erected along the Coast, as these accommodations grow, this section is undoubtedly destined to be the great all-the-year-round resort for those who follow the game fish, or the game bird; and nowhere along the coast of the United States are either to be found in such variety, or in such numbers.

New Mexico, according to the United States Government Geological Survey, has 160,000,000,000 tons of coal in sight, most of it a good coking coal. This is 50,000,000,000 tons more than the available supply of the entire State of Pennsylvania. It is rapidly growing and developing its many heretofore undeveloped resources.

All of these Southwestern States have many mineral resources of great value, the greater part of which are undeveloped, and must remain so until ample railroad facilities are provided.

The resources and the possibilities of these Southwestern States have only been touched upon; but in view alone of the few facts stated, can it be doubted that, with proper railroad expansion, these States will fail to have an enormous increase in growth in the near future? Nowhere else are there the same large, idle areas, in an equally healthful and congenial all-the-year-round climate, awaiting the settler. Nowhere else can lands be bought at lower cost, or from which more varied crops, or greater returns, can be had from the investment. Nowhere else can be found the agricultural, industrial and commercial possibilities, going hand in hand to a greater extent.

When we consider the change in the world's traffic movement which the opening of the Panama Canal will bring about, will not these Southwestern States, with their conveniently located seaports on the Gulf, be placed at a big advantage over what has prevailed? Is not the Gulf of Mexico the natural downhill outlet for the export products of field and factory from all that great central area lying between the Rockies on the west and the Appalachian Mountains on the east—in which area is produced 80 per cent. of our agricultural exports? Should not a larger part of this export business move along nature's route? Up to this time it has been possible to divert traffic to unnatural routes, but the traffic will move along the lines of least resistance, just as the rivers

flow to the sea. These Gulf ports in a short time will in point of tonnage handled rival their Atlantic and Pacific Coast competitors; and will not this business itself build and support large commercial centers in the Southwest convenient to the deepwater ports of the Gulf?

In the 20 years ending in 1910, the population of the six Southwestern States increased 64 per cent., and in the same period the railroad mileage increased 98 per cent. or one-half faster than the population. These figures prove conclusively that the railroad is the pioneer and has and should continue to lead in development.

We now arrive at the point where the question naturally arises, what will these six Southwestern States require in railroad mileage in the future, in order that it may be possible for them to go forward as other parts of the country have gone in the past, with no greater natural resources, and no more reason for growth; and what will be their attitude toward the capital necessary to build them? To make it possible for these Southwestern States to continue to increase in population as they have done in the past 20 years, the railroad mileage will have to grow at least as fast as it did during that time, and these six States, which now have about 43,000 miles of railroad, should in 20 years have 70,520 miles, or 27,520 new miles, and should also have at least half as many more new miles in the form of second and third main tracks, yards and sidings.

This will mean that there should be constructed in those Southwestern States in the next 20 years, 27,520 miles of new single track railroad, with sidings, yards, shops and terminal facilities, and 13,760 miles of additional second and third main tracks and additions to sidings, yards and terminals or a total of 41,280 miles of new railroad.

Using \$45,000 per mile for the cost of the 27,520 miles of new single track, with its sidings, yards, terminals and equipment, and \$30,000 per mile as the cost of the 13,760 additional tracks, we have a total expenditure of \$1,651,200,000. Spread over 20 years, this would call for an average annual expenditure of \$82,560,000 dollars for new railroad construction, shops, terminals and equipment to properly take care of the increased population and business of these six Southwestern States.

Rare Minerals of the South

By FRANK L. HESS of the United States Geological Survey.*



IN dealing with rare minerals one is reminded of two old sayings, "Despise not the day of small things," and its corollary, "Small things make perfection but perfection is no small thing." Because some men were willing to labor patiently over small things and through their drudgery developed uses for almost unknown elements which made more perfect the use of other materials and of electricity, millions have been benefited by better lights, travel is apparently to be made secure through harder, tougher steel rails, and the South has found a profitable market for minerals which before were known only to the adepts.

MONAZITE.

For a time after the use of incandescent electric lights became common it seemed as if the days of gas as an illuminant were nearly numbered and that it would have to give way to electricity. It was known that lime, thoria and other of the alkaline earth and rare earth metals (so called because their oxides and minerals are earthy and non-metallic in appearance) were incandescent when hot, but few thought of using them to improve the lighting power of gas. Lime was used in the oxy-hydrogen flame for intense illumination, but the temperature required to bring about its incandescence was too high to allow its use with ordinary gas jets. Welsbach found that thoria (oxide of thorium) and other oxides of the rare earth metals which did become incandescent at the temperature of an illuminating gas flame could be made into a mantle to cover a Bunsen burner and that by a proper mixture of the oxides a pleasing light and one very much more intense than the ordinary gas flame could be obtained. The mantle quickly became popular and its use increased the revenues of the artificial gas companies and staved off the change to electricity. Natural gas, the flame of which has very little illuminating power, can, with these mantles, be used to advantage for light. The mantles are also adapted to gasoline flames, and it is a source of wonder to most travelers to go into stores, churches, and dwellings in out of the way places of Alaska, the deserts, or the dry plains and find them by these means as brilliantly lighted as buildings in favored cities. Similar mantles have also been adapted to kerosene lamps, but so far the lamps upon which they are used have been too expensive to become very popular. To supply the demand for thoria and other rare earths for making mantles only one available mineral is known—monazite, a phosphate of cerium, lanthanum, praseodymium and neodymium (all rare earth metals) containing also a variable percentage of thorium, yttrium and silicon. Other minerals containing thorium have been found, but not in sufficient quantity to be of much commercial value. The thoria (thorium oxide) content of monazite, ranges from less than 1 per cent. to more than 20 per cent. and ordinarily monazite must contain 3 per cent. or more to be of merchantable quality. The larger part of the world's supply has been drawn from Brazil, where it is found in large quantity in the sands of certain parts of the ocean beach along Espirito Santa and Southern Bahia. These sands when first found were so rich that they were shipped without treatment. They went as ballast to Germany and paid great profits. The next largest field is that of North and South Carolina, where in a strip roughly 20 to 30 miles wide and 150 miles long, many small valleys and stream beds have been and are being successfully mined for monazite. This strip all lies within the Piedmont Plateau and borders closely on the Blue Ridge. It contains all or part of Alexan-

der, Burke, Caldwell, Catawba, Cleveland, Gaston, Iredell, Lincoln, McDowell, Polk and Rutherford counties in North Carolina, and Anderson, Cherokee, Greenville, Laurens, Oconee, Pickens and Spartanburg counties in South Carolina.† The monazite in these deposits is in the form of a light yellow sand and is said to have been discovered in commercial quantity by Mr. Wm. P. Headen in 1879.‡ A few tons of monazite, only, were produced up to 1893, at which time monazite mining began in earnest and 55 tons were produced during that year. From the beginning of 1893 up to the end of 1909, 5350 short tons of monazite concentrates, valued at about \$1,040,000 were produced.§

The monazite lies in the soil and gravel derived from the breaking down of a gneiss which has been intruded by pegmatite, a coarsely crystallized form of granite. Monazite is mined much as is placer gold. In the simpler plants sluice boxes are used at the head of which the gravel is shoveled onto a screen to separate the coarse pebbles, which are thrown aside. The fine gravel is carried by a stream of water over riffles behind which the monazite is caught. Hydraulic plants in which both hydrostatic pressure and steam are utilized have been operated at several places and concentrating tables have been used for separating the screened gravel.

The concentrates contain from 15 per cent. to 70 per cent. of monazite, with titanium minerals, garnet, zircon, quartz and other minerals as impurities. The concentrates are brought to a higher degree of purity, 90 per cent. or over, by concentrating tables or magnetic separators.

An English company made an effort to mine monazite from the rock near Shelby, N. C., but was unsuccessful. The tenor in monazite was found to be too low to allow profitable mining.

In 1909 the production of crude monazite sand, more than two-thirds of which came from North Carolina, amounted to 988 tons, averaging about 25 per cent. monazite, valued at about 3½ cents per pound. From the crude concentrates 271 tons of refined sand, valued at \$65,032, were obtained. The Carolina monazite carries from 3 to 7½ per cent. of thoria. The figures for the 1911 output are not yet available.

ZIRCON.

Zircon is another of the rare earth metal minerals and of it the South has been the only American commercial producer. Zircon is a silicate of zirconium and from it zirconia, the oxide of zirconium, is prepared. Although zircon occurs in nearly all granite rocks, in only a few places is it found in sufficient quantity to pay for mining. The principal known American locality is at Zirconia, Shelby county, North Carolina. The zircon is found in crystals reaching three-fourths of an inch in length in decomposed pegmatite. After rough crushing of the rock the zircon crystals can easily be separated by washing. Another deposit from which, however, no production is known to have been made, is seven miles northwest of Cash, Okla. Recently other zircon deposits which may be of commercial importance have been found in Virginia.

Few commercial applications of zirconium have been found, and, so far as

*Published by permission of the Director of the United States Geological Survey.
†Sterrett, Douglas B. Monazite and Zircon: Mineral Resources of the United States for 1907, part 2, United States Geological Survey, Washington, D. C., 1908, page 787, and same, 1908, page 792.

‡Nitz, Henry B. C. Monazite and Monazite Deposits in North Carolina: North Carolina Geological Survey, Bulletin No. 9, 1895, page 32.
§Sterrett, Douglas B. Op. cit., 1908, page 804.

known, aside from small quantities of zirconia used in experimental work and in making an inert lining for crucibles used in small electric furnaces, it is used only in the Nernst lamp. This use will be referred to again. Numerous efforts have been made to use it in the ordinary filament incandescent lamp, but so far seem to have been unsuccessful.

YTTRIUM MINERALS.

Yttrium, another of the rare earth metals, is of much more limited occurrence than thorium or zircon. It is really a combination of several metals which are very difficult of separation, so that a chemist who is making determinations of yttrium must give its molecular weight in order that his results may be properly interpreted. Most monazite carries a little yttrium, but not in large enough quantity to be easily recovered.

As has been stated, the oxides of a number of the earth metals are incandescent when heated and efforts were made to use electricity for heating them to utilize this quality. Although they are non-conductors when cold, it was found that they were conductors of electricity when hot and Nernst succeeded in making sticks of various oxides which when given a preliminary heating became beautifully incandescent upon the passage of a proper electric current. It was found that the lamps had a high efficiency and that they could be made to glow in the air without injury instead of having to be kept in a vacuum as with the incandescent filament lamps. It was also found that thorium, which is the chief ingredient of the gas mantle, could not be used in this form of lamp, as it volatilized under the high pressure used. A mixture of 85 per cent. zirconia and 15 per cent. yttria was found to give the best results. As has been stated, minerals containing a high percentage of yttria are scarce and the Nernst Lamp Company of Pittsburgh found that the only available supply was at Baringer Hill, near Llano, Texas, where gadolinite, fergusonite, cyrtolite, polycrase and other minerals are found in masses, the size of which has probably never been equaled by those discovered elsewhere.

Gadolinite has been found in masses weighing up to 200 pounds. It carries about 42 per cent. of yttrium oxide with a molecular weight of 260. Fergusonite, carrying from 31.36 per cent to 42.33 per cent of yttria and accompanying rare earth metal oxides, is found in smaller masses. It also carries some uranium and from a polished surface rarely beautiful radiographs may be obtained. The mineral is not homogeneous and the radiograph shows this excellently. Other rare earth minerals occur in the dike in small quantity. Allanite, carrying too small a quantity of yttria to be used as an ore, occurs in masses weighing up to 300 pounds.

Yttrium-bearing minerals are also found in Virginia, North Carolina and South Carolina, but not in commercial quantity.

RUTILE.

The South possesses other unique mineral deposits in the rutile deposits of Virginia and these are becoming most prominent and important.

Rutile is titanium oxide, and is used as a source of titanium, a metal which has been isolated in pure form a few times only, but which is obtained in ferrotitanium, an alloy of titanium and iron by smelting ilmenite, an iron-titanium oxide, or by smelting rutile and iron together, either in the electric furnace or by the thermit process. The alloy is much used in steel making.

In recent years experiments have been made almost without number to improve steel and cast iron. The heavy duties placed upon many forms of steel and iron work have made imperative the use of the best materials. The capacity of lathe tools for rapid work has been increased four or five times through the alloying of tool steel with tungsten, and it has been tried to accomplish similar results with other forms of steel and with cast iron. On railways under increased traffic and heavier rolling stock rails have worn out rapidly and the breakage has been alarming, causing many costly wrecks, sometimes attended by fearful fatalities. Experiments have been tried with vanadium, nickel, chromium, manganese and other treated steels to produce a rail which would stand the strain. All of these alloys have been found expensive and not altogether satisfactory, but rails treated with titanium are claimed to have more than three times the length of life of the ordinary Bessemer steel rail and to reduce the breakage to a small fraction of that of the untreated rails. The titanium is introduced into the molten steel in the form of ferrotitanium, containing 10 to 20 per cent of titanium. Only 0.10 to 0.15 per cent. of titanium is used in the steel at a cost of about \$2.00 per long ton of finished rails.

The New York Central Railroad now lays nothing but titanium treated rails and many other railroads have laid experimental stretches of the rails.

Excellent results are also claimed from the addition of ferrotitanium to cast iron.

These uses have created a demand for titanium ores, of which the purest and best is rutile.

Rutile is found in small quantity in very many rocks, such as granite, diorite, etc., but in only a few places in large quantity. It is found on Kragerö Island, on the south coast of Norway; near Adelaide, South Australia; at several places in Queensland; and at St. Urban, Quebec; and from each of these places a few tons per year can be produced. At Roseland, Nelson county, Virginia, are deposits belonging to the American Rutile Company, which, so far as can be learned, are much larger than any of the foreign deposits. They are seven miles from Arrington, on the Southern Railway, and are easy of access. The rutile forms 4 to 7 per cent. or even more of a pegmatite which is quarried from a hill alongside of Tye River. The residual soil from the decay of the pegmatite carries rutile and much of it has been treated with the quarried ore. The ore is run through a ten-stamp mill, and over Wilfley tables. As thus produced, the concentrates carry about 86 per cent. titanium dioxide, TiO_2 , the impurity being largely ilmenite. Part of the ore is shipped to North Carolina for magnetic separation, which raises the grade to between 98 and 99.86 per cent. TiO_2 . The company produced 566 tons of concentrates in 1910. With work on a larger scale, the concentrates could be sold more cheaply than now, and the demand will probably soon justify larger production.

In the same general area are dikes carrying rutile and apatite on which unsuccessful attempts at mining have been made.

On Mr. "Ad" Nuckol's farm in Goochland county (Peers postoffice), 17 miles west of Richmond, and on Mr. Henry Bowe's farm in Hanover county (Waldeck postoffice), 25 miles northwest of Richmond, are a number of short pegmatite dikes of irregular width which carry rutile. Some of the rutile which has weathered out is in chunks weighing more than 100 pounds. On the Bowe farm are gravels and soil which may pay to sluice for rutile.

TIN.

It has long been the hope of patriotic American miners and geologists that tin mines, large enough to cut a considerable figure in the world's production, might be found in this country. While the United States produces immense quantities of most metals, it cannot produce, at prices which will fairly compete with other countries, enough tin, nickel, cobalt, antimony or platinum metals to supply its needs.

Several times it was thought that the great American tin mine had been discovered in the South. Once it was in North Carolina, once in South Carolina, and once in Virginia. Tin has also been found near El Paso, Texas, and at Streeter, Texas. Besides these bona fide discoveries, hoaxes have been perpetrated that were based on alleged tin discoveries in Missouri and Alabama, though at the latter locality a very little cassiterite (tin oxide) may really have been found.

The deposits of North and South Carolina occur in a comparatively narrow belt about 30 miles long, lying in the Piedmont Plateau, between Lincolnton and Gaffney, S. C., with a generally northeast-southwest direction, curving to the east in the middle, at King's Mountain station. The tin occurs in decomposed pre-Cambrian pegmatite dikes in a deeply decayed gneiss and the decayed condition of the rocks makes mining easy for depths as great as 125 or 150 feet.

In North Carolina an attempt at tin mining at King's Mountain was made in 1887 by Dr. Albert Le Doux and associates, but after a year or two the effort was given up. Eighteen or 19 years later Capt. J. W. Foster and associates prospected the same ground and erected a mill at King's Mountain (station). Captain Foster states that sufficient ore of a low grade was found to justify further operations, but that difficulties other than the ore supply compelled a cessation of work. For a number of years Mr. John H. Furman has been developing tin deposits near Lincolnton for several companies. He claims to have much low grade ore running in the neighborhood of 1 per cent tin, and that it can be mined at a profit. He has erected an experimental mill and is now working the deposits.

At Gaffney, South Carolina, Capt. S. S. Ross has operated from time to time on a tin deposit at the extreme southern end of the tin belt and is probably the only tin operator in the region who has made money. Residual placers on his property were easily worked and gave an excellent quality of concentrates which sold at a high price.

As to the future of these deposits, I can only say as I did after examining them in 1906:*

"The question which the geologist is expected to answer, however, is, What are the prospects for finding paying deposits of tin, and especially large deposits?"

"In reply, only a few general statements can be made.

"Erosion has gone on extensively for a long while, at any rate since before Tertiary time, and yet no extensive placers have been formed; at least none have yet been found. Here and there patches of good ground have been found, but they are of small area. In the dikes themselves no rich pockets, at all comparable to those of the Australian or Cornish deposits, have been discovered. A great amount of alteration in the dikes themselves and in the surrounding country-rock, and the large number of fluorine and boron-bearing minerals, showing extensive action by fumarolic vapors or water from igneous masses, such as are generally present in most of the tin-producing regions of the world, are here absent. Rich pockets may be found in depth. As to the last objection, that there is little alteration of gangue or country-rock, the Bolivian deposits, which now make up the second producing tin region in the world, and give the greatest lode production of tin, are said to show generally very slight metamorphism due to pneumatolitic action or to ascending mineralizing solutions.

"The tin-bearing belt has a considerable length, through which tin is found, and it seems not unlikely that somewhere in this strip commercially valuable deposits may be developed."

The Virginia tin deposit is on Cash Creek, near Vesuvius station. Here tin-bearing quartz veins cut granite, a type of deposit very different from the tin-bearing pegmatites of the Carolinas. These veins were tested more or less completely about twenty years ago and much money was spent. Legal difficulties ensued and the property has been idle since with all interested parties playing a waiting game. Just what the real value of the deposits may be is known to few. Some, however, have faith in their possibilities.

Fifteen miles north of El Paso, Texas, considerable work has been done on a series of five short veins cutting granite on the eastern base of the Franklin Mountains. Within the past two years a small mill and smelter have been put up and a few tons of metallic tin have been made. Operations appear to have ceased, at least for the present.

The occurrence at Streeter, Texas, is of merely mineralogical interest and not of commercial importance.

OTHER RARE MINERALS.

Tungsten, tantalum, and uranium minerals are found at a few places in Virginia, the Carolinas, Georgia and Alabama, but not in important quantities.

Nickel deposits near Brinton, Virginia and Webster, North Carolina have attracted considerable expenditures of money, but have so far made no returns.

*Engineering Magazine, New York and London, Vol. 32, October, 1906, pp. 19-20.

Electricity and Its Relation to Industrial Development in the South



NOWHERE in our country has greater progress been made in the development of its natural resources during the past 20 years than in that section universally known as "The South." In view of the almost limitless wealth of its agricultural possibilities, its rich deposits of coal, iron and mineral phosphates, its unequaled hardwood forests, its enormous aggregate of undeveloped water-powers and its delightfully equable climate, it is difficult to understand how such exceptional opportunities so long escaped attention of legitimate enterprise. During the long years which witnessed the unprecedented growth and development of the West and Northwest Horace Greeley's ringing advice, "Go West, young man; go West!" became the one all-absorbing thought of Eastern capital, so that it was only with the gradual filling up of that section and the greatly increased property values that the Western movement was checked and the financial interest of the country directed toward the marvelous opportunities close at hand, yet so long neglected in the South.

The marked industrial expansion in the Southern States and their assumption of new importance in the commercial activities of the country at large may be traced directly to an increasing appreciation of their mineral deposits, agricultural possibilities and water-powers. The favorable change of attitude on the part of the investor has been brought about in no small degree by the basic and permanent character of the developments inaugurated.

Industrial activity will always center where raw material and power for manufacturing purposes can most economically be found in conjunction. In general, in the past, raw materials have been transported to the nearest available source of cheap power. With the introduction of electrical distribution conditions have been largely reversed and power is now delivered at the point best suited for manufacturing and shipping purposes. It is, therefore, in the extensive water-powers that the real basis is to be found for the confidence with which capital has been poured into Southern industries.

The public at large is so accustomed to the finished products encountered on every hand as to scarcely realize the absolute necessity of cheap mechanical power for the often exceedingly complex processes through which the raw materials, as taken from the fields and mines, must pass before reaching the market. Never has the importance of cheap power for manufacturing purposes been more strikingly emphasized than in the increasing evidence of material prosperity which accompanied the development of these Southern water-powers.

The emphasis, however, is to be laid upon the utilization of electrical transmission and application of this power. The potential and kinetic energy of the mountain streams and rivers has existed from times immemorial, while the principle of impulse and reaction water-wheels was understood by the ancients 6000 years ago. The insuperable difficulty, however, lay in the fact that the point of generation and the point of desired application of power were often widely separated and that no practical means of distribution was known. With the appreciation of the possibilities of electrical transmission and the perfection of highly efficient electric generators, motors and transforming devices the problem was solved and the way opened for the hitherto impossible development of the abundant natural resources of the South.

No greater evidence of the incalculable economic value of electric power is necessary than the readiness with which the needed capital has been provided for hydro-electric developments and the marvelous rapidity with which electrical systems of a magnitude undreamed of a few years since have sprung into existence. That this unprecedented growth has been healthful and inherently sound is also sufficiently attested by the fact that, in spite of the rapid extension of facilities for supplying electric power, it has been difficult to keep pace with the demand. Wherever transmission lines have extended new industries have sprung up, new factories have been erected, and a new lease of life and energy has been given the community. Old mills have invariably found it cheaper to discard their former mechanical drive in favor of the electric motor. Steam equipments are rapidly being thrown out or modified to permit the local generation of electric power either for regular service or as an auxiliary to central-station service. The magnitude of central-station systems, with their reserve equipment and high degree of supervision exercised, afford a guarantee of continuity of service which can scarcely be equaled in a small isolated plant. There are still, however, many districts not served by centralized systems where small water-powers, which would be inaccessible if mechanical drive were necessary, can be developed to advantage electrically.

In the final analysis of the many and diverse factors which have together resulted in its present and promise of still greater prosperity this tremendous total of available power must be reckoned as perhaps the greatest of the natural resources of this wonderful country, since without ample and relatively inexpensive power the richest of fertile lands and mineral deposits are incapable of most efficient development.

For many years the States along the Atlantic seaboard and Gulf were famous throughout the world for their fertile lands and thoroughbred stock. Cotton was the chief staple, though its culture and subsequent transformation into manufactured products were far below the possibilities demonstrated in recent years through the scientific investigation of requirements of the soil, the elimination of the boll-weevil and the introduction of improved machinery operated by cheap electric power.

Formerly practically the entire cotton crop was shipped in a raw state to Northern mills or to England because of lack of manufacturing facilities at

home. This in spite of the fact that the estimated energy of the rivers and streams of the Southern Appalachian range amounts to approximately 3,000,000 horse-power, at least 50 per cent. of which is available for hydro-electric development.

The first hydro-electric development for the purpose of supplying power to textile mills was made by the Columbia Water-Power Co. The directors of this company were far-sighted enough to quickly appreciate the profitable business in this field for a centralized power system, and became heavily interested in financing the Columbia Mills, which were the first to adopt electric drive.

The Southern Power Co. is situated at the strategic center of the cotton belt in the Piedmont district, which includes North and South Carolina and Eastern Georgia. Plans are already completed for a total development of approximately 300,000 horse-power, and future development is limited only by the demand for power, as it is estimated that within a radius of 60 miles of Charlotte, N. C., 1,000,000 horse-power could be obtained from hydro-electric developments. The economic value of a dependable supply of power at reasonable rates distributed over lines with an aggregate single circuit length of 1000 miles can hardly be comprehended.

The introduction of electric power marked the beginning of a period of transition in course of which the South has become a strong industrial competitor of the North. With an abundant supply of raw materials and cheap power close at hand the logical and speedy result was a new and undreamed-of impetus in the textile industry. In fact, the possibilities of electric drive for cotton mills were first demonstrated in Southern mills at Columbia, Pelzer and Anderson, with the results so gratifying that many mills in the North quickly followed suit.

The first electrically equipped textile mill in the world was put into operation at Columbia, S. C., in 1894; the first direct-connected spinning-frame motors were installed at Anderson, S. C., in 1896; the first new mill to be operated by electric power generated at a distance was erected at Pelzer, S. C., in 1894, while the first "fine goods" cotton mill to equip its weave shed with individual drive was at Greenville, S. C., in 1910.

All the usual and now unquestioned advantages of electric drive were found to apply to cotton mills, and further that in some respects the electric motor was peculiarly adapted to meet certain requirements of cotton machinery. It has been shown repeatedly that with motor drive, due to the higher and steadier speeds obtained, the total output of the mills is increased from 5 to 15 per cent. This alone is sufficient to place the introduction of electric power in the front rank among the great physical and economic forces which are surely winning back for the South, in a new form, its old-time glory and prestige.

Some conception of the importance of electric drive in the cotton industry is to be had from the following list showing the total capacity of motors installed to date in the textile mills of six of the Southern States by the General Electric Co. alone:

	Horse-power.
Alabama.....	4,880
Georgia.....	15,109
Louisiana.....	2,310
North Carolina.....	46,279
South Carolina.....	68,696
Tennessee.....	1,802
Total.....	139,076

The textile mills of North and South Carolina are using more electric power in proportion to their spindles than any other section. More than one-third of all the power required to operate the mills in these two States is electric.

It is interesting to note that the General Electric Co. has sold up to date an aggregate of 410,000 horse-power of motors for textile mills, or at least 20 per cent. of the power required to operate all the textile mills in the country, many of which are still employing the old cumbersome and inefficient mechanical drive.

The presence of extensive bodies of iron ore throughout Western Georgia, Tennessee and Alabama has long been known, though only recently has their development attained important proportions. In marked contrast with the long haul by rail and water necessary to supply the Chicago and Pittsburgh steel centers, transportation of raw materials is an insignificant factor in the cost of producing steel from this district. The increasing industrial activity all through the South is creating a strong local market for rails and structural steel, and with the gradual exhaustion of the famous Superior deposits the almost limitless ore bodies of the Birmingham district will assume greater and greater importance. Nowhere in the world are to be found in closer conjunction the three essential materials for the manufacture of iron and steel, namely, coal, limestone and iron ore. These materials in abundance have been placed by nature ready for man's use with the least possible expenditure of labor.

In the operation of mines and the manufacture of steel electricity has long since won its way with characteristic rapidity to first place as a means of distribution and application of power. In fact, in no other field have indi-

vidual motor applications reached the magnitude attained by the main roll motors for rail, plate and billet mills, the largest of which has a maximum torque equivalent to 23,000 horse-power.

It is estimated that for every ton of pig-iron produced approximately 6250 cubic feet of gas is generated in the blast furnaces. Fifty-five per cent. of this is used in heating stoves, operating blowing engines and other miscellaneous purposes. The remaining 45 per cent. is available for the generation of electric power through the medium of internal-combustion engines or steam turbines fed directly or indirectly from gas-fired boilers. Assuming this gas to have a heating value of 90 B. T. U. per cubic foot and 10,000 B. T. U. per brake horse-power, approximately 25 horse-power is available from the waste furnace gases for every ton of pig produced. When it is considered that some steel plants already in existence have a daily output of from 3000 to 4000 tons the significance of these figures is realized. It is obvious that in order to most efficiently utilize this energy it must be distributed electrically.

In addition to the vast amount of electrical power used about a steel plant for operating rolls and auxiliary machinery, the electric furnace promises to become an important factor, particularly in connection with the open-hearth process for producing high-grade tool steel, etc. To make the electric furnace commercially successful cheap electric power is necessary. Nowhere is this more readily available than from the exceptional water-powers within practical transmission distance of the Birmingham district.

One of the largest industries in the South is the lumber industry. The increasing scarcity of timber of all kinds, and particularly of the hardwoods used for furniture and better class of interior house finish, have turned the attention of the entire country to the splendid hardwood forests of the Southern Appalachian slopes. Nowhere in North America are such luxuriant growths of hickory, oak, walnut and other valuable hardwoods to be found.

Lumber plants requiring large amounts of power have grown up in many sections and have become almost as fully committed to the use of electric power as have the cotton mills. There are many reasons why motor drive has proved especially suitable for woodworking plants, chief among which are the minimized fire risk, due to the possibility of locating the power-house at a safe distance from the inflammable material about the plant and the unequalled facility with which electric power can be efficiently transmitted to any desired point. Of necessity the buildings of a large lumber plant cover a con-

siderable area, and with only a mechanical system of power distribution the most economical arrangement and sequence of operations cannot be obtained. Individual motor drive does away with long lines of power-consuming shafting and belts, and insures greater cleanliness, ease of operation and improved quality of the product. It permits the use of a lighter and less expensive building construction than is required where line shafting is employed, and consequently reduces the investment, interest, depreciation and annual maintenance charges. Extensions and overtime operation requires an expenditure for power proportionate only to the increased output.

The Great Southern Lumber Co. operates the largest electrically equipped lumber plant in the world at Bogalusa, La. In this plant, which has an annual output of 175,000,000 feet of lumber, there are installed 81 motors, aggregating 2767 horse-power. The power-house contains two 500-kilowatt and one 200-kilowatt three-phase 2300-volt generators, which supply current for the motors and also for the arc and incandescent lighting systems.

The large deposits of mineral phosphates in Florida, Tennessee and South Carolina are proving a source of no inconsiderable economic value. Motor drive is constantly being used to a greater and greater extent in connection with quarrying the rock and its transformation into artificial fertilizer. Another industry closely allied to the manufacture of cotton goods and fertilizer, which affords a large field for electrical applications, is the preparation of cottonseed oil. The combination of electric lighting and manufacture of ice has also become an important factor in many small Southern towns.

The part played by the electrical manufacturer in this awakening can scarcely be estimated in dollars and cents. Through the initiative of engineering specialists, always alert to discover new and promising fields for extension of electrical applications, electricity has played a most important part in opening up the vast resources of the South. Railway motors, local and municipal lighting systems are met with everywhere. Gas-electric cars are in operation on various Southern lines and are greatly simplifying the problems of efficient transportation. Isolated power plants for winter resorts and large plantations are bringing modern conveniences and efficiency of service to such places as are not already reached by central-station systems. It is not too much to say that with all the marvelous progress which the South has made the possibilities of its future industrial activity, as affected by the electrical development of its unequaled water-powers, are as yet but faintly appreciated.

Utilizing Waste Materials in the South

By JAMES C. LAWRENCE, Chemical Engineer, Memphis, Tenn.



CONSERVATION is in reality simply the practicing of efficiency in all its phases, and the utilization of wastes is one of the important phases.

Someone has aptly said "Conservationists may be divided into two classes: sentimental conservationists and scientific conservationists." The loudest of these is the sentimental conservationist. He shrieks for the "protection" of great waterfalls, but permits our valuable coal deposits to be depleted to the future disadvantage of our power-using industries. A factory using natural power and furnishing employment for hundreds of our men and women under clean, light, sanitary conditions is certainly a better example of conservation than the dissipation of thousands of horse-power of energy by the reservation of a waterfall to satisfy the gaping curiosity of tourists, particularly when these waterfalls need not be totally destroyed to furnish power.

We are coming to the point where, since competition is so keen and the cost of operation is becoming daily a more important question to manufacturers, we are forced to turn our hands to making use of what we have hitherto considered useless. This, then, may be termed material efficiency: the utilization to the greatest possible extent of any substance available for manufacture.

Until the South as a section partially awoke to the realization of the fact that other sections of the country were outstripping her in production of manufactured articles, her industries were running along in a rule-of-thumb, hand-to-mouth manner, throwing away annually many million dollars worth of valuable materials.

Among the earlier examples of Southern conservation may be mentioned the manufacture of cottonseed oil and cattle feed from a product which formerly was considered a nuisance. The value of the cottonseed alone is now somewhere about \$120,000,000 per annum. From this oil a plant in New Orleans obtains glycerine which is used for making dynamite, thus making possible the building of the Panama Canal. Other products obtained from the cottonseed oil are soap and edible and cooking fats.

There was a time when the gases from the great blast furnaces were permitted to escape into the air; now science has harnessed these gases to internal combustion engines which generate electric power for operating mills in Alabama and Tennessee. In smelting the ores of the Ducktown district, vast quantities of sulphuric anhydride flowed from the stacks and destroyed vegetation for miles around. Chemical engineering stepped in, and now these gases are absorbed and made into sulphuric acid, which in turn is used for making acid phosphate from Tennessee phosphate mines to rejuvenate the wornout lands for our farmers.

Our iron industries are now making coke in by-product ovens, where the gases evolved are saved, the tars forming the bases of an immense industry for manufacturing roofing and paving materials recently started at Corey, Ala. Last year we imported coal tar creosote from England and Germany to the amount of 75,000,000 gallons, sending our cash away in return. This plant at Corey will diminish this great importation to a considerable extent.

Many tons of corn are consumed annually in the production of ethyl alcohol. The du Pont Company have installed a plant at Georgetown, S. C., for making over 1000 gallons of this valuable product per day from pine sawdust. Another plant of the same description is under construction in Louisiana, which has contracted for the entire waste of a pine lumber mill situated immediately adjoining over a period of twenty years.

Other methods of utilizing the wastes from pine lumber mills are those for obtaining the turpentine, pine oils and tars. The old-fashioned methods of obtaining turpentine by tapping the trees for the resin destroyed a great amount of valuable standing timber. Now, we take the sawdust, offal and shavings from sawmills, and by processes of distilling and extracting obtain from three to fifteen gallons of turpentine per ton of waste. The Yaryan Company is building a chain of plants of this kind through the Southern lumber districts, and a large concern at Mt. Pleasant, Ga., is now constructing an additional plant costing over \$300,000, which will utilize stump and fallen "light wood" for this purpose, obtaining also wood tar and pine creosote oils.

In one case this has been carried still further, for another concern in Georgia is also making use of the waste wood, after the oils have been extracted, for paper pulp. This residual material is at present used for fuel in most plants, although strange as it may seem, the pulp residue from the manufacture of ethyl alcohol referred to above has been successfully used for cattle feed.

Turning from the field of soft woods we find the industries utilizing hardwood waste beginning to enter Southern fields. From the tops, branches, slabs and edgings of practically all of the hardwoods, there is in Tennessee a plant which manufactures charcoal to supply the iron furnaces and acetate of lime, wood alcohol and wood tars. The acetate of lime is made into acetic acid, which in turn is used for transforming the cotton attached to cottonseed hulls (and formerly thrown away or used to adulterate cattle feed) into the bristles with which you brush your hair in the morning. These fibers from cottonseed are also used for making nitro-cotton explosives, and bring a large income to the South each year. There are three such plants in West Tennessee which cost some \$500,000 to construct. Hardwood sawdust and shavings cannot be used for making charcoal, etc., so the chemical engineer has devised a method of turning them into oxalic acid, of which even in 1910 there was some \$200,000 worth imported into this country.

For years there has been growing wild in Texas a little plant that greatly bothered farmers and seemed a useless object on the face of the prairie. Recently a scientist discovered that if it were placed in a vessel and distilled a very strong but plastic wax was obtained. This is now the basis of the operations of a company which cultivates over 1,000,000 acres of the plant, and the product of which, called candallila wax, is made up into the records which reproduce the sounds in our homes on the phonograph.

The demand for a certain kind of cellulose for making explosives, as well as the demand for a paper-making fiber to take the place of the rapidly diminishing supply of spruce fiber, has brought forth a method whereby sugar-cane

is crushed and the sugar extracted. Then instead of piling the bagasse and burning it, this material is run through a machine which separates the short fiber pith from the long-fibered stalk, both of which are then treated chemically, the former making nitrating cellulose for smokeless powder, and the latter a beautiful strong fiber for mixing with mechanical pulp to make newspaper. More will be said concerning paper fiber in a later paragraph, as it is one of the more important questions before the conservationist at the present time.

At this time, when we hear so much about the "potash controversy" and our government officials are expending every effort to find a suitable domestic source of supply of this material, it is interesting to note that many of our sawmills are daily paying out large sums of money to get rid of the wood ashes that accrue from their power plants. These wood ashes are a valuable source of potash, and a plant is now operating in the center of the hardwood belt of Tennessee, which now takes the ashes from mills for miles around, and by a simple process extracts the potassium and makes it available for potash fertilizer for enriching our farm lands.

Throughout the South there are innumerable springs of salt brine. A great many of these springs or wells have a flow of natural gas which has been permitted to escape unharnessed. There is a \$150,000 plant being established in Alabama, which is to utilize the brine for manufacturing chlorine and caustic soda. The chlorine will be utilized to make an organic solvent, at present imported into this country, and the caustic soda will be used to prepare paper pulp or to refine crude oils. Another use that the chlorine is to be put to is as a bleaching powder for whitening our textile and paper fibers.

The foregoing are some of the methods which have been made use of in the upbuilding of our Southern industries. The paramount question now is:

What is to be done in the future? What opportunities have we at hand for advancing our industries and for taking advantage of present wastes?

We should at least transform our crude products into the refined on the ground where the crude are manufactured. As it is, we sell the crude products to refiners in other sections, who then sell us at increased prices the refined articles. We import coal tar dyes from Germany, but permit our own tars to burn or go to waste as cheap materials. We have illimitable water-power which could be used in pulp mills going to waste, and import wood for paper pulp from Canada. We also are arriving at a point where the nitrogen supply in Chili saltpeter is becoming scarce, but by making use of the electric power, which our streams can generate, we can fix the 33,800 tons of nitrogen in the air, pressing down on each acre of land, so that we will not have to depend upon the nitrate beds of Chili for nitrogen fertilizer.

We burn some 5,000,000 tons of cotton stalks and rice straw per year, while we import paper fiber at \$40 a ton from Norway. Mr. A. D. Little in his mono-

logue on "The Earning Power of Chemistry" says: "Corn stalks to an incalculable tonnage rot or are burned each year while chemistry stands ready to convert them into feed containing 30 per cent. of sugars, or into alcohol for light and power. Waste molasses is sold for three cents a gallon or dumped into the stream, while alcohol sells for 40 cents a gallon. Skim milk is fed to hogs or thrown away because no one has the enterprise to extract its casein, which is worth more than beefsteak for food."

The field of utilizing our wastes is almost illimitable. We burn coal at \$2.50 per ton under our boilers and in our lime kilns and furnaces, while at our feet are vast beds of lignite and peat, which, if made into gas, will serve the purpose in every bit as satisfactory a manner.

The results already obtained by making use of our wastes are an excellent criterion to work on. It has been estimated that over 50 per cent. of the tree is wasted before it is made into lumber, and when we consider the quantities of lumber that are turned out by our Southern mills, it can readily be seen that in utilizing wastes we have scarcely made a beginning. I have personally seen several mills which burn daily over 1000 tons of refuse in their incinerators, and know of many others whose destructiveness is only limited by their cutting capacity. To realize vividly the destruction of our resources that is going on, it is only necessary to turn to the advertising pages of any lumber journal to see the pictures and advertisements of firms who "guarantee our refuse burners will consume more waste wood per day at less expense than any other."

Experiments have shown that the slack and low-grade slaty coal which is usually scattered about the coal mines as unsuitable for shipment will produce excellent gas which can generate power or be used as an illuminant. We should work toward the day when instead of throwing the greater part of this away there will be installed large producer units at the pit mouth whereby electric power may be generated and carried for miles over cables to the industrial centers. The problem of a waning coal supply is bringing with it higher prices, and we have here one method of counteracting the increase. It has been demonstrated that by using producer gas for burning limestone there is produced about one-third more lime with a given amount of coal than if direct firing were used.

Endless examples and instances of successful methods for utilizing our wastes could be cited, but the above should be sufficient to demonstrate (1) that the South has turned her attention to this problem to some extent and has profited thereby, and (2) that the possibilities of continuing the work are practically limitless.

And still we at times hear young men complain that the days of opportunity are past. In reality opportunity in the guise of waste materials is knocking loudly and insistently at the door of every manufacturer in the South.

Wet Land Reclamation

By EDWARD WISNER, of New Orleans.



ET land reclamation now has the call. It is the next logical step in the development of the natural resources of this country. And it is economically opportune. For several years past our agricultural development has failed to keep pace with the growth of the country in population and industry. This means that the basis of all real prosperity is growing relatively narrower. It means higher living cost and restricted opportunity for the oncoming generations, unless the remedy be found and applied.

The basis of all agriculture and allied industries is plant food. Now it happens that Nature has created vast reservoirs of plant food just as she has placed reservoirs of fuel in the coal mines and oil fields. From all of the humid highlands of the world Nature takes her annual toll of nitrogen and all manner of plant food and carries some of it to the sea and much of it to the lower basins called swamps, and in these swamps are today the accumulations of millions of years of toll from the highlands, and besides is the accumulated nitrogen of the rank vegetation in which all swamps abound. In the United States these vast plant food reservoirs are for the most part an unused asset. The highlands, although of inferior soil, are always first utilized in all countries for obvious reasons. But the time comes in the development of all countries when the swamps are utilized and these food reservoirs are tapped and become the chief dependence in feeding and clothing mankind. That time has arrived in the United States. The magnitude of the undertakings is tremendous. Forty States, according to the last Government report, contain nearly 80,000,000 acres of swamp and overflow lands, varying from Rhode Island with 8064 to Florida with 19,800,000 acres. These figures I consider somewhat excessive, but allowing for all reasonable deductions the area is vast and so generally distributed over the whole country that the wet land reclamation movement is more genuinely national in its scope and benefits than any other development appealing to the American people. But while the task is great the reward is many times greater. Based upon results in the reclaimed districts of Holland, the swamp lands of the United States could provide homes and sustenance in generous measure for the entire population of the country today. And all of these vast possibilities are not in some untamed country thousands of miles away from home.

The wants of a hundred million people who want more than any other like population in the world constitutes an assured demand for the potential food and clothing in these undeveloped swamps, without which somebody will be cold and hungry.

Within the limits of the humid portions of the United States lies unused, and from any practical standpoint valueless, an undeveloped resource capable of supporting in generous measure the entire population of this great country.

To a great extent, adjacent to centers of population and the best markets, checked by the tracks of trunk line railroads and with more than the average of water transportation, nearly eighty million acres, according to government estimates, of the richest lands of the world invite the men and money of the most aggressive race which the world has yet produced to a conquest which must have a profound influence upon the national life; a conquest which the pressure of population has made an economic necessity, and at a time when modern machinery and plethoric coffers make it possible without any perceptible strain upon the productive forces of the country. Nearly all of the necessary great railroad lines have been constructed; too much of our forest area has already been cleared and subdued; great cities have been built, and the reclamation and utilization of the great reservoirs of plant food, which in the ultimate means food and clothing for men, is the next logical move, and the first steps have already been taken.

Swamps and marshes are repulsive and their difficulties are usually too great for the individual homesteader, and thus they are in all countries left until the last agricultural resource to be utilized. With a population increasing approximately twice as rapidly as the increase of the cultivated area, the time is certainly ripe for a general assault on the swamps and marshes. In all of the States except two—Louisiana with seven million acres, and Florida with nearly twenty million acres—there is sufficient resident population to occupy and cultivate the wet lands as rapidly as they can be reclaimed. So vast are the areas in Louisiana and Florida that both States will offer opportunities for millions of new people as the drainage work progresses.

The States showing greatest activity in this work are probably in the order named—Louisiana in the reclamation of the alluvial wet prairies of the lower Mississippi; Florida in the drainage of the Everglades by the State; Minnesota in the northern portion of the State—State work; North Carolina in the eastern coastal plain region, and in the Mississippi bottoms of Missouri, Arkansas and Mississippi. Considerable work is also in progress in Wisconsin, the Dakotas, Iowa, Illinois and California, with more or less in nearly all of the forty humid States. Great acreage has already been drained, particularly in Ohio, Indiana, Illinois, Michigan and all of the central and lower Mississippi Valley States, and it is possible that the Government estimate of the swamp area includes considerable of the already drained lands and is by so much excessive. But in any case there is enough left to make the job a stupendous one, and one which will arouse the interest and enlist the energy of the nation.

The wet lands of the United States may be divided into three classes. First, the coastal plain lands which are at or near tidewater, and which extend in places all along the Atlantic and Gulf coasts. This class may be

subdivided into two kinds, namely, the alluvial lands found at the mouths of the rivers, most notably the Mississippi, and which are the soil wash of the valleys brought down and deposited in the sea, and to such an extent that they have been built up to or above sea level, and second, those portions of the continental formation which are at or near sea level. These two kinds differ in value very materially, as will be shown later, but the method of reclamation is practically the same: that is, the drained areas must be enclosed by levees and the excess rainfall must be pumped off, just as is done in Holland and the fen country of England.

The second class is the flood plains of the rivers where the land is normally well drained except in flood times. This area is great in the Mississippi Valley and not considerable in other States.

The third class consists of the natural basins into which the waters from the higher lands drain and where sufficient of it is impounded to make the land too wet for agricultural use. These basins are the most familiar swamps and are from a few square feet in area to the millions of acres known as the Florida Everglades.

All these classes contain woodland and prairies or marshes; all three classes vary in fertility, and I think it ought to be stated in passing—as a warning—that not all swamp land is fertile, although most of it is, and that caution should always be exercised in its purchase. There are some portions of the sea coast which have a quicksand bottom, and such lands are and probably always will be valueless, and it may be stated as a general rule that the fertility and desirability of a swamp soil may best be determined by the character of its subsoil, ranking: alluvial, first; clay loam, second; hard clay, third; hard sand, fourth; leachy or loose sand, fifth; rock with shallow soil, sixth, and quicksand, worthless.

Any great material development has these normal stages. Agitation, speculation and actual development grind. Swamp land reclamation is in the grind. The years of agitation were many, and likewise the discouragements. The speculative period is not over yet, and there will be more or less speculation throughout the period of development. But the actual dirt-moving period is now some years old, and in all of the States containing large acreages the reclamation question is a live one.

So much for a general survey, which shows the nation-wide importance of the movement.

In Louisiana, where I am more familiar with the situation, the work of reclamation of the seacoast prairies, which has been in progress for several years, at first in a small and experimental way, is assuming greater proportions. The new drainage law, which permits the organization of drainage districts and the issuance of semi-municipal drainage bonds, is now being utilized, and settlers—actual farmers—are being brought here by the carload, and they are buying land for future delivery when the reclamation shall have been completed. Altogether, the drainage outlook is bright. The opportunity

for legitimate money-making is too attractive to go longer neglected. It has taken nearly three thousand years to make America what it is—a single generation of live Americans can double the present agricultural capacity of this country. Of course, it is worth while and will be done.

Hundreds of thousands of acres have passed into new and capable hands, and more than a dozen large reclamation projects are actually in the dirt-throwing stage, and what is significant is the fact that two of the large enterprises are owned and financed at home, and interested in them are some of the biggest financial men of the State. Of course, only a small part of the seven million acres in South Louisiana, which is properly styled the American Holland, is yet fully reclaimed, but what is ready for occupancy is rapidly taken up and large acreage is being sold to substantial Western farmers for future delivery. Investors are coming to the State in increasing numbers, and what is better, they are not, as a rule, of the purely speculative type, but are developers in a broad way.

Probably the most significant feature of the awakened national interest in wet land reclamation is the recent organization of the National Drainage Congress, which was organized in December, 1911. This is really an offshoot of the National Irrigation Congress, which for many years has been a powerful factor in arid land reclamation. Its first independent congress is to convene in New Orleans April 10 to 14, 1912, when it is expected that the drainage sentiment of the country will be welded into a cohesive power for the prosecution of this great work. Delegations are expected from all of the forty States containing swamp lands. The success of this congress means that the attention of men of financial ability and the people who need the homes and opportunities to create will be centered upon this great work; and that is all that is now necessary.

Men of national reputation will be there in numbers, and others active in their own States will swell the attendance. Never before were New Orleans and Louisiana so much alive to their possibilities; reduced rates are expected on all railroads, and every power which the local people can use will be invoked to make the National Drainage Congress a noteworthy success.

To all of the multitudes in all America who are interested in the live question of land reclamation, New Orleans extends a cordial invitation, and promises to show results in work already accomplished sufficient to arouse enthusiasm and give impetus to swamp land development everywhere—Louisiana with her ten-million acres of reclaimable swamp land, with capacity to duplicate the agricultural production of the home empire of Japan or surpass the production of alluvial Holland, Belgium, England and Egypt combined, is anxious to lead the nation in this work, and no better city could have been selected for this drainage congress and no better month than balmy April.

Land reclamation by drainage is the next big development, and the time is now.

The South's Lumber Problem

By HU MAXWELL, Expert, United States Forest Service.

THE South will not reap the full harvest of its forests if it continues to pursue the policy of shipping its lumber in the rough. It must manufacture its woods into commodities at home and send them to market. Furniture, vehicles, sash, doors, blinds, handles, coffins and caskets and agricultural implements are some of the ultimate products which the South must make. What sound business principle is conserved by shipping boards to cities a thousand miles distant, there to be further manufactured and doubled or quadrupled in value, when the South is able to do it at home? There was a time when all the cotton went raw to distant mills, but that is no longer necessary. Nor is it longer necessary to dispose of forest products in that manner. The furniture factories of North Carolina, and others in Memphis, Tenn., and still others in Kentucky, are showing that the South can do its own manufacturing and sell the product to the ultimate consumer. But these are only points here and there in the South, and are at present no more than prophecies of what will come to pass and guide-posts marking the way.

The report of the Commissioner of Corporations is authority that the Southern States possess 634,000,000 feet board measure of standing timber, of which 209,000,000 are hardwoods. That is a vast quantity of wood, but it will not last forever, and it is now high time to take a businesslike survey of the field and see what is happening. The annual cut of all the Southern mills is about 23,000,000 feet, and if that rate continues the South will be without much timber in 30 years. No one is advocating the policy of a miser by hoarding what ought to be wisely used, but sound business recommends that the resources ought to be fully used, not merely half used. When lumber is shipped in the rough out of the country when it might be doubled in value by being further manufactured at home it is only half used. It is time to quit halfway methods and get the full benefit. The 23,000,000,000 feet of lumber which now represents the South's annual harvest of trees can be doubled in value and the profit kept at home.

North Carolina furniture manufacturers convert about 150,000,000 feet of rough lumber yearly into their products, supplying nearly all of the raw material from their own forests, though the State's annual lumber cut is only 900,000,000 feet. If all the Southern States would do as well, in proportion to the yearly cut of their sawmills, the total output of furniture would consume nearly 4,000,000,000 feet of raw material. Add to this a reasonable amount of vehicles, handles, farm implements and other commodities, and the South would work up the most of its annual sawmill output.

The South, with all its forests of soft and hard woods, does not make the tools and machines for cultivating its own plantations or harvesting its crops; does not supply its own people with vehicles, with pleasure boats, doors, office and store fixtures, woodenware, musical instruments, refrigerators, or even with coffins and caskets to bury the dead. It is time to face about. Great as are the South's agricultural resources, it has manufacturing possibilities almost as great. It has the cheapest wood in the United States, except that on the Northwestern Pacific Coast. Illinois pays \$37.89 per thousand for rough lumber of which to make furniture, North Carolina buys it for \$18, Louisiana for \$17, Wisconsin pays \$41.02, Illinois \$41.49 for vehicle wood, while Kentucky buys it for \$30, North Carolina for \$26.30 and Louisiana for \$19.46. Similar proportions hold in many of the wood-using industries in the North and in the South. The difference in cost of material is in almost every instance in the South's favor. It is bound to remain so as far into the future as facts will warrant the observer to look. The North is much nearer the end of its timber supply than the South is, and even now is drawing some of its most necessary woods from Southern States. As neither section of the country is doing much in the way of planting timber for commercial purposes, or even in keeping fires out of forests, there is no reason to suppose that conditions either in the North or South will change much for the better in the near future. The South will continue to have more standing timber than the North, and whoever does the bulk of wood manufacturing will draw large supplies from the South.

Does the South's opportunity lie in continuing to send its lumber away in the rough condition, or in working it up at home?

Take the one instance of red gum and see what the South is missing. It grows this wood, but except in a few localities is not converting much of it into the finished product. It is shipped in the log or as veneer, or as rough lumber, to Northern factories making furniture, musical instruments, interior finish and office fixtures, and it goes out in the market of the world under the name of Circassian walnut, cherry, birch and mahogany. It lends itself to more imitations than any other known wood. The Italians and French buy it, carry it across the seas, make it into furniture and sell it as French or Italian walnut. The English work it into "satin walnut." Some of this high-grade product comes back to the land where the red gum trees grow and is sold to wealthy people who can afford to buy it. The buyer marvels at its beauty, and little suspects that the 2000 per cent. advance which he pays on the selling price of the red gum lumber goes to remunerate the thrifty foreigner for

knowing a good thing when he sees it and understanding how to turn his knowledge into money. A Missouri manufacturer of red gum lumber had been sufficiently well shown to express the sum of his experience in these words: "We can sell red gum in Europe, but it does not seem to be good enough for the Missourians."

Why cannot the South manufacture its own red gum? Why not boost this wood and make it famous under its own name as the European and Northern manufacturers are doing under the names Circassian, French, Italian and satin walnut, and mahogany, oak and curly birch? Red gum is cited as a single instance of where the South is letting slip the opportunity to, make money and build up business at home. There are other woods which might be cited as further examples of neglect of opportunity and failure to appreciate resources at every Southern man's door. The South has a hundred woods, some of great value, others of comparatively little, but all offering possibilities to the man who can look ahead or even look around him. If a business can be built up in the North in manufacturing pipe stems from the pitiful little fire cherry, what may not be done with the handsome, strong, attractive and promising scores of Southern woods waiting for their time to come?

The South possesses the raw material, the necessary labor and power for enormous development of its forest resources. Experience in rolling mills and cotton factories proves that the labor of the South is as efficient as that of any other part of the country when properly trained. Any failure to develop the resources of its forests has not been due to lack of skill and willingness to do the work, but to want of purpose and foresight on the part of business men who have preferred to sell rough lumber for \$15 rather than work it further and double the profit. It seemed easier and simpler not to do it, and too many have had an eye singly to the line of least resistance.

Some parts of the South have abundance of water-power; other portions have little. The rivers which pitch down from mountains, if harnessed to wheels, dynamos and motors, will operate mills and factories over wide areas, but in the flat countries where rivers are sluggish the manufacturer of wood commodities cannot make the rivers drive the wheels. Fortunately, he does not need to. Abundance of coal is within reach by rail and river, and cheap power is available. But the fortunate situation extends still farther: the factory which makes things out of wood seldom needs to burn much coal for power purposes, for the factory waste goes far toward supplying fuel—the shavings, sawdust, blocks, chips and trimmings. There need be little ultimate waste in a well-regulated furniture or other woodworking factory.

The complaint that Southern forests are so far from the market for finished products that freight and other costs would eat up profits is not well taken. No one should be deceived as to where the markets are. If routes by rail are rather long from some of the lumber centers of the South to some of the furniture, door, implement and other markets of the North, East and West, perhaps there are other markets as good and within reach. Water transportation is cheap and the South's rivers carry commerce up and down, and two sides of the South are washed by seas which afford free highways to all the maritime countries of the world. Ships loaded with furniture, caskets, tanks, small boats, boxes, fixtures, machinery, vehicles and other articles made of wood now sail from Galveston, New Orleans, Mobile, Pensacola, Savannah, Charleston, Norfolk and other ports and discharge their cargoes in the ports of nearly every civilized country. This trade is not now large, but it shows the lines and the directions in which growth is to be expected. The South does not need to depend upon foreign markets for its forest products, for it can sell at home, but the foreign markets open a field for surplus after nearby markets have been supplied, and the available and possible markets are so large that there need be no fear of oversupply.

One thing is necessary. High standards must be set and maintained. For instance, sometimes the Southern dealer complains that Southern-made furniture is not equal in workmanship to that made in the North and East; and, though his patriotism inclines him to patronize Southern industries, business prompts him to buy and sell the best article obtainable. This complaint is by no means general, but it is occasional, and it should be duly considered. There is no doubt that Southern workmen and Southern factories can turn out work of as high grade as those of Illinois, Michigan or Massachusetts, but training, care and perseverance are necessary to maintain the standard. Tennessee, Kentucky and North Carolina now sell furniture in New York, Chicago and Boston. That is proof that the Northern markets are not closed against manufactured forest products from the South. In fact, some of the South's best markets are already in the North, and no limit to that market's possible expansion can be set. Foresight, push and enterprise will determine that.

The estimate offered above, that at the present rate of cutting the forests in the South will be in an advanced state of depletion in 30 years, assumes that the present rate of cutting will continue and that new growth will not amount to much. Two assumptions are here made which ought to be modified. The time will never come when the South will be without timber resources. Those resources may be expected to dwindle greatly, but there will always be something for the lumberman to cut. The sawmill output will decline when scarcity begins to pinch, and in course of time a condition will be reached when the new growth will balance the yearly cut. Massachusetts has probably reached that condition now, though its sawmills turn out hundreds of millions of feet yearly. It will be able to draw that much from its forests every year forever because growth and harvest are equal. That future waits the South, but no date can be set for its arrival. In the loblolly-pine regions, from Southern Maryland through Virginia and the Carolinas, new growth is now great each year, but in most other parts of the South new growth of a promising kind is not conspicuous. There appears to be dependable historical evidence that there is more loblolly pine in the South now than there was 200 years ago. In this respect its history is similar to that of paper birch of the Northeast. Loblolly pine pushes into vacant ground, preferably old fields, and grows rapidly. It will continue to do so in the future. It furnishes an example which other species will be encouraged to follow. Landowners will keep their waste

places at work growing timber, because it will pay. They do that now in Massachusetts, where white pine is given right of way. The Southern landowners will pick out trees which pay best and will discourage all others. Loblolly pine and Cuban pine may be two of such species, because they push in vigorously and grow rapidly. Long-leaf pine and cypress are probably doomed to disappear because of too slow growth. No landowner will wait 100 or 200 years for a saw log to grow. The cottonwood, the black willow and the willow oak may become more important timber trees in the South in years to come than they are now. There is much wet land in the South, and these trees flourish there and grow rapidly. They will pay for their keep, and the slowly-growing species must get out of the way. When preservative treatment of wood to hinder decay becomes the rule (as it will), less preference will be shown long-lasting woods. The Carolina poplar post will last as long as the osage orange and will grow in quarter of the time. Landowners will encourage vigorous species which grow rapidly, and will have nothing to do with those which must be given a century to be worth anything. When that time comes the South can grow all the timber it needs, and it may be depended upon that the manufacturing of it into finished products will be done at home.

South's Industrial Future Brightest

By E. J. BUFFINGTON of Chicago.

In reply to your request for an expression of opinion concerning the future of the South as a field for investment and development, the inquiry necessarily directs one's thought to certain fundamental conditions which are influencing to a marked degree our whole country respecting this question. Never before in this country were the underlying conditions which constitute the basis for investment and industrial development more favorable than they are found today.

There is an abundance of capital well distributed throughout all sections of our country, and credits are not unduly expanded. Commercial and financial adjustment, following the panic of 1907, has brought about a soundness in general business conditions, which alone should insure an era of active investment and industrial development. Why, then, should commercial and industrial development in any part of our country show hesitation and indications of the influence of doubt? The answer is, that surrounding these sound fundamental conditions is an atmosphere vitiated by political uncertainty. That capital under the influence of uncertainty is timid is an accepted axiom of political economy. Its truth finds most emphatic verification in present business conditions.

Regardless of the plentitude of money and sound financial conditions, there is observable a pronounced hesitation on the part of capital to engage in new enterprises; capital employment being restricted to those activities which administer to immediate or nearby necessities.

No one should desire to encourage unwise business activity and industrial development, but certainly all of us have a desire to see our national policies so shaped and established as to invite and encourage the free development of the country's resources. The political uncertainty which is making capital timid at the present time is centered in our unsettled tariff policy and in the grave questions concerning the meaning of our laws regulating commerce involved in the enforcement of the "Sherman Anti-Trust Law."

While personally holding views favorable to a tariff which fairly protects and freely develops home industries, and believing that prevalent views concerning the intent and effect of the "Sherman Anti-Trust Law" do not allow capital free opportunity to serve the modern commercial needs of the country as it should, there is no intention to incorporate herein any argument for protective tariff or for the repeal of the "Sherman Anti-Trust Law." It is desired, however, to express the opinion that so long as these important questions remain in dispute and doubt there will exist timidity on the part of capital which will minimize the exercise of its function in the development of our resources and industries. With capital it is doubt and uncertainty which generally disturb and retard quite as much (if not more) as the substance of policies under discussion.

Certainly the South is most vitally interested in encouraging capital to freely seek employment in the development of her wonderful resources. The world's increasing demand for cotton fabrics has greatly increased the wealth of the South during the past few years. Modern agricultural methods have greatly diversified the farm products of the Southern States and the fertility of soil has produced abundantly. The industrial development of the South has just commenced. The great resources of her mines and forests, supplemented by well distributed water courses in aid of cheap transportation and power development, make the future of the South, from an industrial standpoint, seem brighter than that of any other section of our country. The Southern coast line, with numerous shipping harbors advantageously located, gives promise to the South of large participation in the growing commerce of the world. No other section of our country will participate to a larger extent in the commercial benefits to result from the opening of the Panama Canal.

The great social problem which has confronted the South, involved in her large negro population, is progressing towards satisfactory solution.

These conditions all point to the South as a most inviting field for investment and industrial development. With political uncertainties removed it does not require even the stimulus of an optimistic temperament to forecast for the South an unprecedented era of prosperity in the immediate future.

Energy, Integrity and Intelligence Will Count

By JAMES B. FORGAN, President First National Bank, Chicago, Ill.

From all sources of information at my disposal I entertain the brightest hopes for the future of the South. The fertility of its soil, the diversity of its products, excellent transportation facilities, and above all the energy, intelligence and integrity of its inhabitants cannot but lead to a high degree of permanent prosperity.

Packing-House Industry's Relation to Southern Progress

By CHARLES H. MACDOWELL, President Armour Fertilizer Works, Chicago.



FOR many years the Southwest was the principal cattle ranch of the country, sending annually its millions of beef critters through the can and barrel by the Kansas City-Chicago route to the world's markets. The Texas type of steer was at best a poor sort, was long-horned, rangy and toted some 750 pounds of meat, hide and hoofs at five years. He seldom graded "dressed beef" and was somewhat of a problem in a product selling way. He knew no fence and no master save a "man on horseback." He had no pride in his ancestry. Some of his clan were at times driven North, and in about four years came to market. Occasionally he got into the feed lot of prosperity and was introduced to corn as a steady diet. His nature, his habitat and his boss—the cowboy—furnished volumes of romance. His uncertainties, his numbers, his large ranging ground and his distance from most anywhere afforded sufficient green hills far away perspective to bait promoters' customers—and he was "invested" in. The canned meat trade was largely founded on his personality. He was, however, too prolific to be so largely marketed and not good enough to be eaten fresh; he oversupplied and his day passed. He served his purpose, however, and made of value large stretches of semi-arid country. He was the South's contribution to the packers' problem of modern methods, now so fully solved. His exit was through the can and barrel. The refrigerator car was not along his route.

How is it today? In numbers the Southern steer is less numerous. In quality he shows improvement. In weight he averages 1100 pounds at three years. He generally grades "dressed." His horns are smaller—he has pride in ancestry and great hopes of posterity; he is fence broken and is "some critter." Many of his yearling brothers are shipped to Denver and on to Montana, but, generally speaking, when he travels he goes to the nearest market. This market is Fort Worth—a distinctly Southern packing point. Fort Worth was established as a packing center to save freight on the live animal and to thus furnish the more eastern South with its meat food at a less cost. Since this market was established nine years ago, some 3,289,581 cattle, 1,540,260 calves, 4,354,502 hogs and 650,733 sheep have cashed in at Fort Worth. The packer has gone to the source of supply. Two modern packing-houses have been built there. Large stock-yards facilities are maintained. The industry at Fort Worth employs 4500 men. Smaller houses have been built at other points.

Hogs in Texas? Yes, and in Oklahoma, too, and the packers need more. They can be grown. There is an unlimited market in Fort Worth for all the hogs that can be grown within shipping distance. A quick crop, a cash crop, a diversifying crop, a paying crop.

By-product utilization is fully carried on at Fort Worth. The 1100-pound steer dresses out 600 pounds beef carcass weight. The 65 pounds of hide and 435 pounds of offal, containing 70 per cent. water, are handled there, and freight is saved over shipping this water to Kansas City or East St. Louis. This means that beef can be sold at Birmingham, Savannah, or where not, at the Fort Worth market plus the freight on the 600 pounds of beef. Now, Birmingham grows more iron than beef—it needs the Texas beef so it can go about its iron-making with a full gang and a large dinner pail. The butcher thumps the dinner pail three times a day in most homes in this country; the price of meat is important to the worker. It's a subject he is interested in. He is a good audience for the politically inclined. It's easy for him to jump from the 5¢-cent live weight cost to the 20 or 25-cent sirloin steak, retail cost, and conclude the packer gets it all—that it's too much—and that he is being wronged. How about the facts? It should be clearly understood the packer does not sell beef at retail. He sells the market man beef from his branch refrigerator, and the butcher cuts it up and retails it. A Fort Worth steer weighing 1100 pounds costs the packer now about 5½ cents live weight, or \$63.25. He dresses 600 pounds beef, which sells at Fort Worth at 8½ cents, or \$52.50—a gross loss, by-product out, of \$10.75, killing cost to be added. After crediting by-product values, this loss is converted into a net gain of less than \$1.25 a head, so by-product utilization materially cheapens the cost of beef to the public. Can one fairly say \$1.25 is too great a profit on an investment in a perishable product of \$63.25? Isn't the contrary true? Fresh meat is the only ready cash part of the sale—the hide, fertilizer and other by-products are held for months for cure and for market. Fresh meat can't be held. It must be moved and its place taken by more fresh meat. The packer must take the stock as it comes to market or the market ceases to be. He is forced to do business, profit or no profit. The never-ending daily receipts are pushing him. At best his profit is confined to less than the difference in freight between the live weight, 1100 pounds, and the dressed weight, 600 pounds—otherwise the steer would be shipped East on the hoof, there to be slaughtered. By-products are handled East as well as West these days.

Now, as to the Southern retailer. He buys the carcass from the branch house at his home town at 9½ cents, compared with the Fort Worth price of 8½ cents—the freight difference. The carcass cuts up 27 per cent. choice cuts—balance cheap cuts, fat, bones, gristle—some worth less than his first cost and hard to sell. Every one wants some of the 27 per cent., and by-passes the cheap meats. Mr. Marketman has to make his hay out of the 27 per cent. He must get a good price on the choice cuts to butter his bread. The cheaper cuts are wholesome and nutritious when properly prepared. France and Ger-

many know how to cook them; their cooks would like some of these cheap cuts if they could get them; that is, the town cooks would, but the old worn-out scarecrow, Texas fever, gives these countries an excuse, and their inspection and tariff stunts do the rest. Europe only needs slight pretense to shut out American meats.

The packer, with his modern methods, has been of great economic benefit to the country; has provided every day cash markets for all grades of stock, making stock farming as steady as any other business; has developed the system of transporting and distributing the perishable meat products of the over-produced West to the over-consuming East and South. The packer has equalized to freight differences the cost of living East with West, Southeast with Southwest; has enabled the manufacturing, mining, specialized agricultural sections to go about their particular work without detailing needed labor to food production tasks. The packer was early forced to develop foreign trade outlets, and his product is found wherever commerce's flag flies; he developed by-product utilization before other industries thought of it, and gave its benefits to the people; has done a huge perishable product business at a smaller per cent. of profit than any other large industry, and yet he is not popular and his friends are not labeled.

One sometimes wonders if we fully appreciate our advantages as a nation, due to no tariff and few artificial commercial barriers between the different sections of our country, and how dependent we are on each other in the game of live and let live; how much we help each other in our intertrading. The South has long been one of the best markets for hog products—the cotton, the cane and some corn have long been cultivated largely on the labor sustaining energy of the corn belt dry salt side, and the townfolk have prospered in close proximity to bacon, ham and the native egg. The commerce hasn't all been in one direction either. Following the lead of making the most of what one has, the cotton man has long since been pressing the edible oil from the cottonseed and shipping trainloads of it to the packing centers, there to be blended into lard compound or tasty butterine—the cotton foots for soap. The South has suffered with the packers in the buffeting butterine has received from the butter man in Washington, who, to prevent poor misguided mortals from being fooled into buying clean, wholesome, yellow-colored butterine, sold absolutely under government supervision, has persuaded Congress to tax the colored article 10 cents a pound, and yet permit, without tax, the snow-white butter of the winter months or of mixed breeds to masquerade under a Jersey yellow mask at 40 cents a pound. To be sure, the uncolored butterine is only taxed a quarter of a cent a pound, but Madam Housekeeper is proud and will not serve the uncolored article to her friends. She wants her butterine colored yellow. Pride goeth before the high cost of living, but pride can be bet on. The 10-cent a pound tax might fairly be cut out, and the South can properly help to that end. Artificial trade barriers between products should be eliminated.

When in the midst of a Northern winter the new potato, the head lettuce, tomato salad and the luscious strawberry follow in orderly procession in a well-served dinner, one thinks of the South, but not of the packer whose necessary invention, the beef refrigerator car, makes these cold time luxuries possible, as the packers' example has led to the development of the ventilated fruit refrigerator car, thousands of which carry safely the South's late winter contribution to Northern good living. So it is in peach time when the Elberta is ripe. Six thousand carloads of Georgia peaches were hauled North by fruit car lines in the summer of 1910. The growing of fruits, berries and vegetables has become a large market occupation, giving added value to Southern hillside, valley and lowland. These fruit cars are iced by Southern made ice and filled by Southern labor. Now comes the heater car to safely guard Maine's Aroostook county seed potato in its journey from its 40 degrees below zero home to its Southern seed bed that many very early potatoes can come to market.

Another and important Southern industry closely related to the packing industry is the manufacture of fertilizers with its related venture, the mining of phosphate rock. In the utilization of by-products at packing-houses a large tonnage of fertilizer ingredients, such as blood, bones and tankage is manufactured. These fertilizer values are mainly shipped South—the great fertilizer consuming section—where in many plants they are blended with cotton-meal, acid made in a large way from Southern pyrites, Southern phosphate rock, Southern sulphate of ammonia, and with the nitrate and potash of the foreigner that they may do their share in the intensification, diversification and crop cost cheapening campaign carried on by the Southern planter. Southern phosphate rock mines are operated to secure the necessary phosphoric acid so needed in Southern soils. The investment in fertilizer and phosphate plants totals large and shows the faith of the packers' affiliated interests in the South's future. These organizations are largely captained by Southern managers, manned by Southern salesmen, accounted for by Southern accountants, typewritten by Southern girls, the plants are superintended by Southern men and labored by Southern darkies. They move by Southern coal and water-power, and their product is shipped by Southern train crews. They are distinctively Southern institutions vitally interested in the success of the South and doing by investment, by pay-roll and by good will all they can in its planning and upbuilding.

Much work remains to be done in the South that it may fully come into

its own. A greater diversification of crops is necessary to put its soil in the best shape for its work and to make the South more self-supporting. Southern agricultural experts are solving this problem, and nowhere is more open-mindedness shown to modern farming ideas than in Dixie. The growth and success of the boys' corn clubs are symptomatic of this, and what the boys are showing their elders is a plenty. Changes and improvements in methods are of steady growth—are not accomplished over night; and the South is making greater progress than it knows in solving its problem of more, better and cheaper per acre of each of the many products it can so well produce. It is the same in manufacturing. The more the South does, the better it does it.

Abundant raw material, increasing transportation facilities and growing organizations better fitted for the work of economical manufacturing and distribution, with closer knowledge of costs, actual and hidden, are forcing Southern manufactured products into the world's markets in fair competition with other sections and other people. It is difficult to start a large business at the top and make it go. One must learn to walk before one runs. So it is in manufacturing. Small plants well managed and safely financed grow into large organizations and seldom fail. The future of the industrial South lies largely in diversified manufacturing, built from the ground up. The South is certainly a land of opportunity.

Insurance in the South

By FITZ HUGH MCMASTER, Insurance Commissioner of South Carolina.



Look backward over thirty years of insurance upbuilding in the South, and to try to prophesy what the next thirty years will bring forth, arouses many and varied thoughts. It is to think upon what has been done, what might be done, and to try to solve the riddle how.

From the imperial seat of human brotherhood, shaded by the stars and stripes, let us review the past, see the present, and try to peek into the future.

Looking backward thirty years, we wonder how the South has survived, much less grown and prospered, when we learn what she has had to pay to others.

After making reasonable allowances for commissions to agents and taxes and losses paid in the South, careful estimates indicate that at least seven hundred and fifty million dollars has been taken out of the South in the last thirty years for insurance. About half of this is gone for good; the other half will probably come back some time before the last great day of judgment.

Now, what shall we do about the outflow of the South's capital for insurance?

Let us fix in mind a few correlated fundamentals.

The sincerest national patriotism would provide equal opportunities for all the people, would equalize the burdens of taxation upon them, and would have the widest scattering of capital throughout the nation.

Capital belongs either to the individuals as such, or to a mass of individuals. Insurance merely makes the mass bear the loss which would otherwise fall upon and possibly crush the individual.

Money, as the blood current of the business body, is the most effective form of capital. But, as no business organism may be trusted either automatically or unselfishly to serve it out to the extremities, so no one business center should be permitted to receive and distribute it. But there should be as many independent local centers as there are distinct localities in the body politic.

Insurance deals only in money; for money only it sells its promises to pay, and in money only it redeems those promises. Insurance principles, being emanations from the divine mind, have no habitat of soil, climate or latitude. But, as these conditions affect its results, localization and separation work purer equities in insurance.

Therefore, since insurance funds are the fluid capital of masses of individuals, widely scattered throughout the nation, the control of these funds should be in as many centers as there are different localities in the nation. Quad erat demonstrandum may be written here, for it must appear that, as great evils have come and will come again from the concentration of control of insurance capital as would come from destruction of all local banks and the concentration of these institutions in a few centers, so insurance should be localized as fully as banking is localized. The decentralization of insurance means the enlargement of local banking capital, for the investment side of insurance is purely a banking feature.

In picturing the conditions of the last thirty years, it may be realized that what is therein true of the South is equally true of the States west of the Mississippi in respect to insurance, and almost equally as true, with two or three exceptions, of all the States west of the Alleghanies.

The wealth of the people of the United States is reckoned at about \$120,000,000,000. The aggregate insurance funds of the people of the United States is about \$4,900,000,000. While this belongs absolutely to something more than two millions of people, scattered throughout the United States, three-fourths of it is controlled by very small coteries of men in five Eastern cities, and over one-third of it is the assets of three companies in one city, with one man controlling one of them, and his influence most powerful, if not controlling, in the other two. And yet these enormous funds are merely trust funds, the legal title to which is in about two millions of persons, scattered throughout the United States. What has become practically self-perpetuating oligarchies control and manipulate these funds, though the oligarchies are merely the trustees. The real owners have not the faintest voice in their control. And wonderful to tell, when a considerable number of these owners, as represented by a sovereign State, which gives being itself to such companies, seek to require the funds, held in trust for themselves, to be invested in their own State's irreproachable securities as did Texas, managements, which have been elected by possibly so much as one per cent. of the policyholders, are able, in their arrogance or in resentment at interference with their banking interests, not only to defy the State, but assume to have exclusive control of the accumulated assets of her citizens in their trust, together with the annual contributions, which perforce those citizens must continue to make. And, indeed, there is suspicious evidence to show that, by the very power which these assets give and through insidious and covert attack, these managements seek to discount the credit of the very State itself.

The absolutism and tyrannous despotism of this power is well illustrated

by the statement of an officer of a large so-called mutual company to the effect that if every other State in the Union does as Texas has done, his company would withdraw to the one State in which is his home office. And yet, in the home office State of that company, there is less than 10 per cent. of its policyholders. Certainly such power is now exercised. Whether it may be restrained under present laws is doubtful. Federal or State legislation may be devised to correct it.

The one great contribution to humanity which the United States has made is that it solved the riddle of democracy in allied sovereignties—a government of, by and for the people through representatives. Yet our Government has utterly neglected to require, within her bounds, agencies touching the most vital interests of the people, but conducted in the manner of the most absolute despotism to conform to this principle of safety for the rights of the people. Two such antagonistic systems, viciously hating each other, cannot continue together forever. Democracy, for its own preservation, must destroy the other or finally be destroyed by it. Some system, giving the policyholders control of their companies, must be devised and enforced by government, for the individual policyholders themselves are unable to do it.

In the absence of control by policyholders, many of the managements have lost sight of the sole and only purpose of the companies whose affairs they manage. As the president of one of the great companies said recently in addressing its agents and encouraging them to get business, in effect that he regarded the agents of life insurance companies as the railroad builders, the bridge builders and the highway builders of the country, for they gathered the funds which were put to such uses. Such, sometimes, is the soul-possessing idea in the operation of what should be solely insurance concerns. Behind the blind of insurance they seek the capital of the people to be used for ends entirely foreign to the purposes of insurance. Intent upon gaining these ends, the interest of policyholders are sacrificed and their funds wasted in a wild dance of delirium in the seeking for business. And the horror of it is that worthy concerns, intent upon the true purpose of their being, are either caught in the whirlpool and wrenched from their moorings; or, being unable and unwilling to pay the price set for business, are outdistanced and discounted in public estimation. New York has sought to prevent this by limiting the amount that may be paid for new business, but devices are numerous to laugh this restraint to scorn.

As stated, the insurance accumulations of the United States are about \$4,900,000,000. The annual incomes of the insurance companies are about \$1,300,000,000. Three-fourths of the assets are controlled and three-fourths of the incomes are received in the five cities of New York, Philadelphia, Newark, Hartford and Boston. The advantages which the mere location of the home offices confer are immense, but under the hitherto unrestricted methods of investing the benefits conferred upon the home States and home cities are startling in some respects. For instance, in the New York companies only from about 14 per cent. to 20 per cent. of their insurance in force is New York State, yet from about 75 per cent. to 95 per cent. of their real estate mortgages are there. And, taking South Carolina as a fair representative of conditions in the South, on the same basis, South Carolina's share of the real estate mortgages, in a certain company, would be \$1,150,000, but there is actually only \$15,000 so invested. In another company, where South Carolina's share should be \$650,000, there is actually invested only \$85,000. To a very large extent these are representative instances of the outrageous disproportionate treatment South Carolina has received at the hands of the Northern insurance companies, licensed to do business within her bounds. And what is true of South Carolina is true of the entire South. To overcome this outrageous neglect, Texas in 1907 passed a law requiring life insurance companies licensed in that State to invest 75 per cent. of their Texas reserves in Texas securities. About nineteen of the largest companies then withdrew from Texas. But the result has been that the investments of those companies, which have remained, have enormously increased, and so many Texas companies have been organized and these domestic companies have done so much business that Texas has advanced from twenty-third place to seventeenth place in her rank of States by assets of domestic life insurance companies. Of the forty-five States which have life insurance companies, the other ten Southern States rank as follows: Virginia, fifteenth; Georgia, twenty-first; North Carolina, twenty-second; Tennessee, twenty-fifth; Alabama, twenty-seventh; Florida, thirty-third; Arkansas, thirty-fifth; Louisiana, thirty-eighth; South Carolina, forty-third, and Mississippi, forty-fourth.

Will the States of the South follow the lead of Texas and peremptorily require the investment of reserves, or bring such pressure to bear as may cause the investment of their just proportion of the assets of the companies, or will they continue in a state of dolce far niente, do nothingness? It may be said that the action of Texas is that of Germany, France, Italy, Austria, Russia,

Canada, Mexico, and probably other countries. Indeed, it must be confessed that apparently whenever the matter has been carefully studied and fairly presented, the position has been taken, absolutely and unqualifiedly, that the aggregate capital of the people in the form of insurance funds must be invested within the State to which they belong.

Even admitting that such requirement would cause the retirement of many of the older companies, it undoubtedly would result in organization and upbuilding of local companies, which finally would well-nigh destroy the present centralized control of insurance capital. It would add immensely to local banking capital, and probably soon make each State, where wealth is actually produced, independent financially.

The writer of this article, as Insurance Commissioner of South Carolina, is not proposing this measure in South Carolina for the reason that, under the operation of the present South Carolina law, companies from other States are being induced not only to invest their full South Carolina reserves, but portions of the reserves belonging to other States in South Carolina securities. If other States are content with this process, South Carolina should be.

The situation as presented, not only for the South, but for the rest of the country, with the exception of a few States in the East and of Wisconsin, under the operation of whose laws nearly all companies of other States are excluded, and of Texas, which requires the investment of her reserves in her securities, is not only what is to be done for the upbuilding of local insurance companies, but what is to be done in respect to the great funds belonging to the citizens of these States, but which are now practically at the beck and call of a few men in the East.

It is believed that a careful and unprejudiced study of the subject will convince any one that, both from a national and from a State standpoint, there should be a working to the position that companies of other States should be required to invest at least each State's proportionate share of the reserve in such State's securities, and that there should be franchise exemptions for those companies whose home offices are within the State and which pay taxes on the property situate within the State. If such be done, it is believed that an

enlightened public sentiment will so favor home companies deserving it as to do much towards the upbuilding of local companies and in overcoming the dangerous concentration of the insurance capital of the country.

Certainly, it is woeful to contemplate the lack of insurance upbuilding in the South in the past thirty years. The following percentages represent the amount of insurance in force in the home companies of each State as compared with the insurance in force in all companies licensed in those States: Virginia, 13.5 per cent.; North Carolina, 17.5 per cent.; South Carolina, 2.3 per cent.; Tennessee, 6.7 per cent.; Georgia, 12.2 per cent.; Florida, 8.7 per cent.; Alabama, 3.5 per cent.; Mississippi, 2.7 per cent.; Louisiana, 1.8 per cent.; Texas, 45.7 per cent.; Arkansas, 3.5 per cent.

The following are the like percentages of fire insurance in home companies in each of the States: Virginia, 16.5 per cent.; North Carolina, 16.4 per cent.; South Carolina, 5.2 per cent.; Tennessee, .8 per cent.; Georgia, 13.3 per cent.; Florida, 6 per cent.; Alabama, 2.4 per cent.; Mississippi, .6 per cent.; Louisiana, 8.9 per cent.; Texas (1909), 3.8 per cent.; Arkansas, 5 per cent.

Statistics are not at hand to show the condition in respect to other miscellaneous forms of insurance, but knowledge of the facts warrants the statement that there is even greater lack of development therein than in life and fire insurance.

This is discouraging in the extreme when the obstacles which new and small companies have to meet are considered. While size is of infinitesimal value, yet it impresses the public. Age may cover a wicked past and an infected present, but it gives confidence as to permanence. But most of all, accumulated assets give power to employ agents, to spread expenses and to do other things, which absence of such assets will not permit.

But with the awakened intelligence of the South, her own confidence in her material resources, the inspiration to effort, and the knowledge that is taking hold of all men everywhere that each one shares in the upbuilding of a community and each one must finally suffer in its impoverishment, there is hope, great confident hope, in the upbuilding of the South in insurance in the thirty years to come.

Water-power Development in the South

By H. M. BYLESBY of Chicago.



At the present time there is more activity in water-power development in the States south of the Ohio and Potomac rivers and east of the Mississippi River than in any other section of the Union. Among the causes for this situation is the more fair and reasonable treatment being accorded in the South to individuals, or more generally corporations, who are capable of and willing to develop water-powers than pertains in other sections of the United States. Another reason is the existence in the South of many water-powers which afford a feasible development at a commercial cost and with a present and increasing market available. The entire South is developing and expanding at a rate which probably is not appreciated by those whose entire time is spent in that section. The development of nearly every class of industry—the manufacture of cotton, all classes of mineral development, the iron industry, the large chemical undertakings—all provide a desirable market for a water-power company, and these industries support an increasing population demanding a full share of the comforts and a reasonable share of the increasing luxuries of modern life.

The present condition of the conservation policies of the Federal and many of the State Governments has stopped the further development of water-power enterprises in the sections covered by these Federal or State restrictions. There will be a continued pause in the development of water-power industries in these sections until a policy is adopted by the governing and restraining bodies which will permit of a profitable employment of capital, and further with the opportunity on the part of capital and brains and labor to compensate itself for its energy, its daring and its skill by ultimately realizing more from these pioneer undertakings than is realized from some form of investment from which, through long establishment, all risk has been eliminated.

It is probable that the water-powers now in operation in the Southern States, and including those under development but not yet in operation, will produce a power which if produced by coal would require between 4,000,000 and 5,000,000 tons annually. These figures are believed to be ultra-conservative.

The energy represented in the water flowing in a stream is an energy which from minute to minute and from hour to hour continuously is disappearing. This energy, unless applied to a useful purpose, is lost absolutely and totally for the period when it was not developed.

The coal in our mines, and largely, with certain limitations, the timber in our forests, if not used today, will be there to be used tomorrow; and, in the case of coal, if not used in this generation, will be available for use ages hence.

Coal, timber and the valuable and precious minerals, if not sold today, can be used or sold tomorrow, next year or 100 years hence. Coal, timber and the minerals, being natural products of the earth, can be made merchantable and sold to foreign countries, if so desired, in this process serving to liquidate an international balance, or to provide for the importation of gold, or to pay for useful merchandise.

The water which is flowing in a stream today unutilized cannot be exported; its energy is not stored for future generations; that unused energy is totally and irrevocably lost. The truest form of conservation for any governing Commonwealth would appear to be the encouragement of the immediate utilizing of the energy in the streams of that Commonwealth and the conserving of the coal and timber which can be conserved.

The uses of electricity, judged by the past and judged by the experiences from day to day, are only in their earliest infancy. There is no manufacturer at the present time who would not prefer to have the various tools in his establishment driven by individual motors instead of the old method of transmitting the power from the steam engine throughout the manufactory by expensive power consuming, rapidly wearing out shafting and belting.

A period is approaching—it is believed to be now within a reasonable distance—when in any given community the bulk, if not all, of the power required in that community will be generated at one point. The next step would be that in any given geographic division again the power for that entire territory would be generated substantially at one point. This one point of generation naturally and properly should be, for communities possessing a water-power, at the water-power; for communities within transmissible distance of the coal mines, at the mines.

By this method economies will be accomplished which are not possible today. The cost of power will be reduced largely as compared to the cost of producing power by the individual consumers through a multiplicity of power-producing plants. There will be a general uniformity following; there will be more or less of an interchange of power demands, so that instead of, as exists in many cases at the present time, and due to the newness of the art, there being at a certain small portion of each 24 hours a very heavy demand and for the balance of the 24 hours a much lesser demand, that instead of this there will be gradually worked out a very nearly uniform consumption of power, which, again, will produce further economies in the cost of production.

The individuals who undertook the development of water-powers in a large way some 15 years ago have pioneered the industry through its many hazards and its many perils. Nothing appears simpler, when constructed and when in operation, than a water-power producing electricity, yet nothing involves in all the preliminary states more uncertainties or greater hazards.

Due to the development of hydro-electric properties, the water-wheel has been almost reinvented; the governing devices necessary in a hydro-electric plant have been created; the art of hydraulic construction has been to all intents and purposes created. The building and successfully operating of long-distance transmission lines has been invented and carried through its period of experiment to its successful results of today. None of these results would have been reached, or certainly not reached in the present generation, if it had not been that as a reward for the enterprise and the courage of the men building these hydraulic developments there was allowed a profit if their work proved successful which would justify them for the hazards they ran and the energy they expended and the experience and brains they brought to bear upon the proposition.

I think the South, as a whole, is acting wisely in treating the hydro-electric proposition with more fairmindedness than pertains at the present time in other sections of the United States.

Every hydro-electric development means money spent in the particular locality where the development takes place. It means the placing within the reach of its lines a class of power which, in its universality, exceeds any other class or kind of power, and at a rate which is always profitable to the users

of this power as against any other form of power at their disposal in that locality.

There are still many problems to be worked out in hydro-electric enterprises, some of which are peculiarly attached to certain of the possible powers in the South. Among these difficulties, more or less local to some parts of the section spoken of, are the deposit of silt, due to the alluvial and sandy sections through which the streams run and the frequency in certain sections of the South of torrential downpours. These difficulties, however, are being met as they occur. They are expensive to overcome, but they will be overcome, and water-powers in the South which are not developed now will be developed if brains and capital and enterprise are allowed that encouragement which it is necessary to give to produce the successful development of any enterprises or of any community.

The South during the past one or two decades has been solving her problems in a manner which has commanded the respect and admiration of everyone. There appears to be no reasonable doubt of the great future of the South

in certain classes of manufacture. The development of these manufactures will bring in more population, will afford a better market to the farmer, the tiller of the soil, the agriculturist and the cattle raiser. This further development will transform what are now waste or nearly waste places into active and prosperous communities. With the vast undeveloped resources of the section we are speaking of, and a suitable encouragement to enterprise, industry, capital and brains, there appears to be no present limit to the possibilities for substantial economic advancement in the development of wealth.

No factor in this development will be of more immediately far-reaching importance than the encouragement of the development of the undeveloped water-powers distributed throughout the entire South. This development will conserve those resources of the South which can and should be conserved. It will bring in its train the thorough, economic upbuilding of that section, and it will give to those who are laboring with their hands and with their brains greater opportunities for bettering their condition in the world than they could possibly have without this development.

One Year's Mineral Production

By DR. WILLIAM TAYLOR THOM of the United States Geological Survey.

IN the following tables will be found an approximate statement of the mineral production of the Southern States in 1910, the statistics of totals by States for the year 1905 being added for the sake of comparison. Some omissions or combinations are demanded by the strict custom of the United States Geological Survey with regard to concealing individual returns. The omissions are unimportant for the general purposes of this paper. The statement for 1905 was made up on a basis somewhat different from that used for the year 1910, and, to make the present statement uniform, the secondary products (as they may be arbitrarily called), clay, coke and iron ore, have been included for 1910 as they were for 1905. These items are omitted in the table of mineral production by States published by the United States Geological Survey in the volume "Mineral Resources of the United States for 1910" in order to avoid the duplication of values for the country that would result, as iron ore is represented under pig-iron, clay under clay products, and coke under coal.

ALABAMA.			
Products.	Quantity.	Value.	
Clay products		\$1,667,559	
Coal, short tons	16,111,462	20,236,853	
Gold, fine ounces (troy)	1,592	32,900	
Iron, pig, long tons	1,939,147	23,754,551	
Lime, short tons	81,696	303,612	
Mineral waters, gallons sold	133,159	30,639	
Sand and gravel, short tons	619,253	187,591	
Silver, fine ounces (troy)	300	200	
Other products		*1,537,204	
Total		\$47,751,109	
Secondary Products.			
Clay, short tons	75,082	\$38,045	
Coke, short tons	3,249,027	9,165,821	
Iron ore, long tons	4,801,275	6,083,722	
Total		\$15,287,588	
Grand total		\$63,038,697	

*Includes bauxite, Portland and puzzolan cement, graphite, millstones, natural gas and stone.

ARKANSAS.			
Products.	Quantity.	Value.	
Clay products		\$578,455	
Coal, short tons	1,905,958	2,979,213	
Fuller's earth, short tons	2,563	29,137	
Gems and precious stones		1,200	
Lime, short tons	26,532	127,068	
Manganiferous ore, long tons	5,030	9,700	
Mineral waters, gallons sold	1,065,676	89,772	
Sand and gravel, short tons	1,061,037	230,680	
Stone		382,611	
Zinc, short tons	286	30,888	
Other products		*891,981	
Total		\$5,350,705	

*Includes bauxite, manganese ore, natural gas and oilstones.

DISTRICT OF COLUMBIA.			
Products.	Quantity.	Value.	
Clay products		\$242,861	
Other products		46,088	
Total		\$288,949	

FLORIDA.			
Products.	Quantity.	Value.	
Clay products		\$237,268	
Fuller's earth, short tons	18,832	170,267	
Lime, short tons	10,482	58,386	
Mineral waters, gallons sold	90,189	14,269	
Phosphate rock, long tons	2,067,507	8,647,774	
Sand and gravel	34,858	21,912	
Sand-lime brick		85,450	
Other products		*49,379	
Total		\$9,284,705	

Secondary products.

Clay, short tons	27,403	\$134,542	
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Grand total \$9,419,247

*Includes stone, etc.

GEORGIA.			
Products.	Quantity.	Value.	
Clay products		\$2,532,038	
Coal, short tons	177,245	259,122	
Copper, pounds	724	92	
Gold, fine ounces (troy)	1,161	24,000	
Lime, short tons	7,621	29,961	
Mineral waters, gallons sold	734,135	63,171	
Ochre, short tons	7,011	70,388	
Silver, fine ounces (troy)	300	200	
Stone		2,027,339	
Other products		*1,041,942	
Total		\$6,048,253	
Secondary products.			
Clay, short tons	66,292	\$233,785	
Coke	43,814	173,049	
Iron ore	313,878	482,659	
Total		\$879,493	
Grand total		\$6,927,746	

*Includes asbestos, barytes, bauxite, Portland and natural cement, fuller's earth, glass sand, graphite, metallic paint, pig-iron, pyrite, sand and gravel, sand-lime brick, slate and talc.

KENTUCKY.			
Products.	Quantity.	Value.	
Asphalt, short tons	11,225	\$65,929	
Clay products		2,567,537	
Coal, short tons	14,623,319	14,405,887	
Fluorspar, short tons	17,003	124,574	
Lead, short tons	50	4,400	
Lime, short tons	3,622	12,468	
Mineral waters, gallons sold	403,736	55,195	
Natural gas		456,293	
Petroleum, barrels	468,774	324,684	
Zinc, short tons	29	3,132	
Other products		*3,492,883	
Total		\$21,512,982	

Secondary products.

Clay, short tons	80,420	\$85,655	
Coke, short tons	53,857	120,554	
Iron ore, long tons	†64,347	86,085	

Total \$292,294

Grand total \$21,805,276

*Includes barytes, natural and Portland cement, glass sand, ochre, pig-iron, sand and gravel, sand-lime brick, silver and stone. †Includes West Virginia.

LOUISIANA.			
Products.	Quantity.	Value.	
Clay products		\$546,873	
Mineral waters, gallons sold	2,313,000	163,975	
Petroleum, barrels	6,841,395	3,574,069	
Sand and gravel, short tons	835,295	372,336	
Other products		*5,462,740	
Total		\$10,119,993	

*Includes natural gas, pottery, salt, stone and sulphur.

MARYLAND.			
Products.	Quantity.	Value.	
Clay products		\$1,848,273	
Coal, short tons	5,217,125	5,835,058	
Feldspar, short tons	9,977	47,340	
Iron, pig	326,214	5,230,824	
Lime, short tons	121,555	377,236	
Mineral waters, gallons sold	1,163,828	102,371	
Slate		78,573	
Other products		*1,920,532	
Total		\$15,440,207	

Secondary products.

Clay, short tons	22,696	\$46,143	
Iron ore, long tons	14,062	29,105	

Total \$75,248

Grand total \$15,515,455

*Includes Portland cement, glass sand, infusorial earth, metallic paint, mortar colors, quartz, sand and gravel, sand-lime brick, stone and talc.

MISSISSIPPI.

Products.	Quantity.	Value.
Clay products.....		\$632,999
Mineral waters, gallons sold.....	309,450	43,975
Sand and gravel, short tons.....	363,121	159,482
Other products.....		3,696
Total		\$840,152

MISSOURI.

Products.	Quantity.	Value.
Barytes, short tons.....	22,978	\$75,598
Cement, Portland, barrels.....	4,455,589	3,858,088
Clay products.....		7,087,766
Coal, short tons.....	2,982,433	5,328,285
Glass sand, short tons.....	186,342	130,686
Infusorial earth.....		71,978
Lead, short tons.....	14,225,992	14,225,992
Lime, short tons.....	179,550	846,123
Mineral waters, gallons sold.....	657,035	96,488
Natural gas.....		12,611
Sand and gravel, short tons.....	5,922,118	1,208,833
Silver, fine ounces (troy).....	32,200	17,400
Stone		2,520,665
Zinc, short tons.....	140,652	15,190,416
Other products.....		*1,969,125
Total		\$52,640,054

Secondary products.	Quantity.	Value.
Clay, short tons.....	287,445	\$509,433
Iron ore, long tons.....	78,341	168,697
Total		\$678,130

Grand total..... \$53,318,184

*Includes copper, metallic paints, petroleum, pig-iron, sublimed blue and white lead.

NORTH CAROLINA.

Products.	Quantity.	Value.
Clay products.....		\$1,223,664
Copper, pounds.....	181,263	23,021
Gems and precious stones.....		710
Gold, fine ounces (troy).....	3,120	64,500
Lime, short tons.....	9,952	40,455
Mica.....		230,460
Mineral waters, gallons sold.....	143,007	21,389
Sand and gravel, short tons.....	62,935	13,406
Silver, fine ounces (troy).....	8,300	4,500
Stone		879,572
Talc and soapstone, short tons.....	3,887	69,805
Other products.....		*44,649
Total		\$2,616,131

Secondary products.	Quantity.	Value.
Iron ore, short tons.....	65,278	\$114,237
Total		\$114,237

Grand total..... \$2,730,368

*Includes barytes, monazite, millstones, sand-lime brick and tin.

OKLAHOMA.

Products.	Quantity.	Value.
Asphalt, short tons.....	11,959	\$65,244
Clay products.....		920,921
Coal, short tons.....	2,646,226	5,867,947
Lead, short tons.....	1,805	158,840
Mineral waters, gallons sold.....	115,000	4,950
Natural gas.....		3,490,704
Petroleum, barrels.....	52,028,718	19,922,660
Salt, barrels.....	2,564	881
Sand and gravel, short tons.....	650,236	186,977
Stone		631,711
Zinc, short tons.....	2,297	248,076
Other products.....		*1,489,954
Total		\$32,988,865

*Includes Portland cement, gypsum and lime.

SOUTH CAROLINA.

Products.	Quantity.	Value.
Clay products.....		\$704,590
Gold, fine ounces (troy).....	1,829	37,800
Mineral waters, gallons sold.....	410,691	78,465
Phosphate rock, long tons.....	179,659	733,057
Other products.....		*467,459
Total		\$2,021,371

Secondary products.	Quantity.	Value.
Clay, short tons.....	29,920	\$122,567
Total		\$122,567

Grand total..... \$2,143,838

*Includes fuller's earth, glass sand, lime, mica, monazite, sand and gravel and stone.

TENNESSEE.

Products.	Quantity.	Value.
Barytes, short tons.....	4,729	\$7,281
Clay products.....		1,414,288
Coal, short tons.....	7,121,380	7,925,350
Copper, pounds.....	16,691,777	2,119,856
Gold, fine ounces (troy).....	135	2,800
Iron, pig, long tons.....	397,569	5,271,765
Lime, short tons.....	88,679	275,701
Mineral waters, gallons sold.....	950,511	71,129
Natural gas.....		200
Phosphate rock, long tons.....	398,588	1,503,350
Sand and gravel, short tons.....	794,092	416,557
Silver, fine ounces (troy).....	69,800	37,700
Zinc, short tons.....	925	99,900
Other products.....		*2,250,907
Total		\$21,396,784

Secondary products.	Quantity.	Value.
Clay, short tons.....	61,407	\$120,753
Coke, short tons.....	322,756	959,104
Total		\$1,080,857

TENNESSEE—Continued.

Secondary products.	Quantity.	Value.
Iron ore, long tons.....	732,247	1,048,323
Total		\$2,128,180

Grand total..... \$23,524,964

*Includes bauxite, Portland cement, glass sand, metallic paint, mortar colors, ochre, slate and stone.

TEXAS.

Products.	Quantity.	Value.
Asphalt, short tons.....	57,713	\$1,040,825
Cement, Portland, barrels.....	1,292,445	1,043,729
Clay products.....		2,863,930
Coal, short tons.....	1,892,176	3,160,965
Copper, pounds.....	2,961	376
Gems and precious stones.....		834
Gold, fine ounces (troy).....	19	400
Lead, short tons.....	33	2,904
Lime, short tons.....	48,200	226,952
Mineral water, gallons sold.....	1,241,248	128,549
Petroleum, barrels.....	8,899,266	6,005,755
Quicksilver, flasks.....	3,520	154,413
Salt, barrels.....	382,164	272,568
Sand and gravel, short tons.....	1,006,584	517,225
Silver, fine ounces (troy).....	364,400	196,800
Stone		554,619
Other products.....		*1,012,607
Total		\$18,383,451

Secondary products.	Quantity.	Value.
Clay, short tons.....	1,114	\$5,986
Iron ore, long tons.....	29,535	34,003
Total		\$39,789,240

Grand total..... \$18,423,240

*Includes natural cement, fuller's earth, natural gas, gypsum, pig-iron, sand-lime brick and tin.

VIRGINIA.

Products.	Quantity.	Value.
Clay products.....		\$1,839,687
Coal, short tons.....	6,507,997	5,877,486
Copper, pounds.....	105,313	13,375
Gold, fine ounces (troy).....	44	900
Iron, pig, long tons.....	444,976	6,207,415
Lead, short tons.....	87	7,656
Lime, short tons.....	141,257	563,567
Millstones.....		5,273
Mineral waters, gallons sold.....	2,441,923	301,523
Silver, fine ounces (troy).....	200	100
Slate		148,721
Stone		1,000,089
Talc and soapstone, short tons.....	25,908	510,781
Zinc, short tons.....	1,168	126,144
Other products.....		*1,622,270
Total		\$18,224,987

Secondary products.	Quantity.	Value.
Clay, short tons.....	530	\$1,486
Coke, short tons.....	1,493,655	2,731,348
Iron ore, long tons.....	903,377	1,845,144
Total		\$4,577,978

Grand total..... \$22,802,965

*Includes barytes, Portland cement, feldspar, glass sand, gypsum, infusorial earth, manganese ore, mangiferous ore, pottery, pyrite, rutile, salt, sand and gravel and sand-lime brick.

WEST VIRGINIA.

Products.	Quantity.	Value.
Clay products.....		\$3,998,045
Coal, short tons.....	61,671,019	56,665,061
Class sand, short tons.....	235,784	282,267
Iron, pig, long tons.....	174,661	2,619,915
Lime, short tons.....	90,419	274,205
Mineral waters, gallons sold.....	336,444	81,742
Natural gas.....		23,816,553
Petroleum, barrels.....	11,751,871	15,720,184
Salt, barrels.....	155,625	62,955
Sand and gravel, short tons.....	509,457	192,194
Stone		1,054,192
Other products.....		*290,598
Total		\$105,058,311

Secondary products.	Quantity.	Value.
Clay, short tons.....	69,630	\$51,543
Coke, short tons.....	3,803,850	7,354,039
Iron ore, long tons.....	†.....	.....
Total		\$7,405,582

Grand total..... \$112,463,893

*Includes bromine, Portland cement and grindstones. †Included under Kentucky.

Summing up the State totals, inclusive of secondary products, for 1910 as compared with 1905, we obtain the following results:

	1910.	1905.
Alabama.....	\$63,038,697	\$51,615,700
Arkansas.....	5,350,705	4,391,187
District of Columbia.....	288,949	317,021
Florida.....	9,419,247	4,828,783
Georgia.....	6,927,746	5,980,292
Kentucky.....	21,805,276	15,015,550
Louisiana.....	10,119,993	6,692,418
Maryland.....	15,515,455	17,595,736
Mississippi.....	840,152	874,279
Missouri.....	53,318,184	20,904,619
North Carolina.....	2,730,368	2,366,144
Oklahoma.....	32,988,865	6,510,437
South Carolina.....	2,143,838	2,286,441
Tennessee.....	23,524,964	18,836,553
Texas.....	18,423,240	13,429,109
Virginia.....	22,802,965	21,128,587
West Virginia.....	112,463,893	74,075,981
Total.....	\$401,702,537	\$266,849,197

Achievement Reflected in Increased Wealth



HE estimated value of all property in the South today lacks but a few million dollars of being three times the value of such property in 1880. As the development of its natural resources in field, forest and mine, together with the use of the products in manufacturing and as a basis of trade and commerce, the South has invested and reinvested the returns from its activities in agriculture, industry and transportation, giving greater and greater cumulative power to itself for the future.

The estimated total wealth of the South and the assessed value of Southern property by individual States and by decades are shown in the following table:

ASSESSED VALUE OF SOUTHERN PROPERTY.

	1880.	1890.	1900.	1911.
Ala.....	\$122,867,228	\$258,979,575	\$270,408,432	\$541,764,761
Ark.....	86,409,364	174,737,755	201,908,783	421,000,000
D. C.....	99,401,787	153,307,541	202,950,000	335,664,395
Fla.....	30,938,309	91,761,711	96,686,954	198,000,000
Ga.....	251,963,124	415,828,945	433,323,691	811,184,316
Ky.....	370,743,384	547,596,788	640,688,240	846,454,020
La.....	160,162,439	234,320,780	276,659,407	546,820,340
Md.....	497,307,675	529,494,777	616,719,782	951,926,271
Miss.....	110,628,129	166,772,279	215,765,947	398,419,138
Mo.....	561,939,771	887,975,928	910,000,000	1,676,929,166
N. C.....	156,100,209	235,300,674	306,579,715	733,746,944
Okla.....			99,338,661	1,326,840,833
S. C.....	133,560,135	168,262,609	176,422,288	287,132,019
Tenn.....	228,154,432	382,760,191	396,363,566	605,050,164
Tex.....	320,364,515	780,898,605	914,007,634	2,515,584,541
Va.....	318,331,441	415,249,107	480,425,025	793,799,964
W. Va.....	146,991,688	186,964,770	240,634,580	1,141,000,000

Total... \$3,595,863,630 \$5,630,212,035 \$6,478,882,705 \$14,131,316,872

The assessed value of property in the South in 1911 was \$14,131,316,872, an increase of \$10,535,453,242 over that of 1880, or an advance at the rate of a little more than 295 per cent.

For individual States the assessed value and its estimated share of the

ESTIMATED TOTAL WEALTH OF THE SOUTH.

	1880.	1890.	1900.	1911.
Ala....	\$428,000,000	\$622,774,000	\$774,700,000	\$1,200,000,000
Ark....	286,000,000	455,147,000	604,200,000	950,000,000
D. C....	220,000,000	343,597,000	928,700,000	1,200,000,000
Fla....	120,000,000	389,489,000	355,700,000	600,000,000
Ga....	606,000,000	852,409,000	936,000,000	1,570,000,000
Ky....	902,000,000	1,172,232,000	1,365,100,000	1,800,000,000
La....	382,000,000	495,302,000	815,200,000	1,400,000,000
Md....	837,000,000	1,085,473,000	1,317,400,000	1,850,000,000
Miss....	354,000,000	454,243,000	557,600,000	990,000,000
Mo....	1,562,000,000	2,397,903,000	3,244,500,000	4,500,000,000
N. C....	461,000,000	584,149,000	682,000,000	1,100,000,000
Okla....	110,000,000	208,050,000	811,600,000	1,330,000,000
S. C....	322,000,000	400,911,000	485,700,000	860,000,000
Tenn....	705,000,000	887,956,000	956,700,000	1,300,000,000
Tex....	825,000,000	2,105,577,000	2,322,200,000	4,100,000,000
Va....	707,000,000	862,318,000	1,102,300,000	1,600,000,000
W. Va....	350,000,000	438,955,000	659,600,000	1,150,000,000

Total \$9,177,000,000 \$13,756,485,000 \$17,919,200,000 \$27,500,000,000

true value, together with knowledge of market values of leading classes of property, such as farm lands and improvements, are fairly safe guides in estimating true value, property that is not assessed at all being also taken into account. This is borne out by the figures of true values officially ascertained in 1880, 1890 and 1900 and those based upon estimates by officials in most of the States in 1911, for the figures reflect the well-recognized manifestations on different material lines of the times. For instance, the period between 1890 and 1900 was one of comparative halting in wealth production, and the increase of \$4,162,750,000 in wealth in those 10 years was \$516,770,000 less than the increase of \$4,579,485,000 that had been made between 1880 and 1890, when the South was in the first flush of its recovery from the great disaster and was opening up many sources of wealth production. The increase since 1900 of \$9,580,800,000, immense as it is and more than twice the increase between 1880 and 1890, is really not astonishing in view of the fact that between 1900 and 1910 the increase in the value of farm lands and improvements alone in the South was \$4,882,419,000, or more than half the total increase, and that such increase had been accompanied by a great increase in the value of real estate generally, and of lumber and mineral lands particularly, while deposits in banks and other financial institutions account for \$1,460,021,205 more of the total increase, which also includes the increase in capital in manufacturing and in investments, in railroads, in banks, in livestock, in farm implements and in personal property of other kinds.

The increase of wealth in the South was from \$9,177,000,000 to \$13,756,485,000, or by \$4,579,485,000, equal to 49.9 per cent., between 1880 and 1890, to \$17,919,200,000, or by \$4,162,715,000, equal to 30.2 per cent., between 1890 and 1900, and by \$9,580,800,000, equal to 53.3 per cent., between 1900 and 1911. That increase was \$403,800,000 greater than the value of property in the South

in 1880, and the increase in that value between 1880 and 1911 amounted to \$18,323,000,000, an advance of 199.6 per cent.

Among the investments of greatest importance made by the South from its earnings have been \$1,000,000,000 spent upon its common schools. The South was very poor in most things save its splendid spirit in 1880. At that time it was able to spend only \$12,471,404 on its public schools, but that sum was only \$10,000,000 less than the income of such schools in the whole country had been 20 years before. In spite of its poverty, though, the South was alert to the necessities in the educational field and the opportunities in it.

The South has several institutions steadily enlarging their facilities for the technical training of the young men of the South, but behind these institutions is the common school system, a monument to the conviction of the South that education is an essential factor in progress. Its \$1,000,000,000 spent upon its common schools, only a portion of the vast sum used for the upbuilding of its whole educational equipment from primary school to university, represent a steady annual increase in expenditures from \$12,500,000 to \$78,000,000, or at the rate of 524 per cent., compared with an increase in wealth of 199.6 per cent. The figures by States and decades are given in the accompanying table. In trebling its wealth the South has increased its annual expenditures for its common schools more than six times.

It has used its wealth, too, in building better homes in city, town and country, in adding to its farm equipment, in extending first-class highways, in rail-

EXPENDITURES FOR SOUTHERN COMMON SCHOOLS.

States.	1879-80.	1889-90.	1899-1900.	1908-09.
Alabama	\$500,000	\$890,000	\$923,464	\$2,498,708
Arkansas	287,056	1,016,776	1,369,810	3,110,164
D. C.	438,567	905,777	1,076,620	2,797,192
Florida	114,895	516,533	765,777	1,714,938
Georgia	471,029	1,190,354	1,980,016	4,005,325
Kentucky	1,069,030	2,140,678	3,037,908	4,850,189
Louisiana	411,858	817,110	1,135,125	3,607,295
Maryland	1,544,367	1,910,663	2,803,032	3,748,021
Mississippi	830,705	1,109,575	1,385,112	2,674,648
Missouri	2,675,364	5,434,262	7,816,050	13,151,365
North Carolina	376,062	714,900	950,317	2,993,045
Oklahoma			686,095	*3,300,000
South Carolina	324,629	450,936	894,004	1,905,236
Tennessee	744,180	1,526,241	1,751,047	3,404,555
Texas	1,030,000	3,178,300	4,465,255	10,289,755
Virginia	946,109	1,604,509	1,989,238	4,393,562
West Virginia	707,553	1,198,493	2,009,123	4,287,606
Total	\$12,471,404	\$24,605,107	\$35,037,993	\$72,731,604
United States	\$78,094,687	\$140,506,715	\$214,964,618	\$401,397,747

*1907-8.

road construction, in municipal improvements of various kinds, sewerage, water-works, streets, etc., and in all adding to its strength for the acquisition of greater wealth.

South Bound to Come to Its Own

By F. J. LISMAN of LISMAN & Co., New York.

As a dealer in securities I am in a position to know that in the last ten years the prejudice against Southern securities, so strongly prevalent up to about 1900 on part of Northern investors, has been rapidly dying out. In the last twelve months, in place of this prejudice, a feeling almost akin to enthusiasm has developed, and I feel quite sure that during the next period of business expansion the South will develop more rapidly than any other section. Firstly, because in the South there has been no previous speculation in lands or industries, and secondly, because hitherto the South has been unable to get capital freely for its expansion.


The greatest danger I see ahead now for the South is that it will be able to get money too easily and that a great deal of business which is likely to lead to the development of a great many concerns will not be founded on legitimate business principles. A reaction from a debauch of that kind is likely to be quite serious, and the people who have the real interest of the South at heart must do their very best to prevent the floating of illegitimate enterprises or of wanton speculation.

I have been very active in promoting the construction of railroads through undeveloped sections of the South, as I felt certain that the South was bound to come to its own, in view of the fact that productive lands throughout the Southeastern States could be bought from \$5 to \$20 per acre, when land no better was bringing in the North and extreme Southwest several times that price. This fact is being rapidly understood, and within another ten years this difference will be adjusted, which will mean a hugely increased population, more manufacturing, etc.

While the opening of the Panama Canal will mean a good deal to the South and Mexican ports, I think, nevertheless, it will be a disappointment in many quarters. New trade routes do not develop the day after the celebration of the digging of a huge ditch. It takes time for trade and custom to adjust itself to new conditions. This is especially the case in Southern or Latin countries, where people are slow to change. The full results of the Canal will not be felt for a generation, and those who look for immediate results, will, I fear, be sadly disappointed. However, steady uplifting is better than speculation and a violent boom with the consequent reaction.

Statistical Survey of the South

Figures of Production and General Progress
Since 1880 in Individual States
by Decades

N the following nine pages are epitomized the essential facts of Southern progress during the past thirty-two years in as far as they may be set forth in figures within limits of reasonable accuracy. They deal with the main lines of production shared by all the States of the South and with the substantial results of that production. Features that cannot be tabulated for all the States or for all the years do not appear in these statistics, but they, as well as the other facts, are discussed more elaborately in the special articles on preceding pages of this issue.

For purposes of comparison the figures of progress in the whole country are also published in this tabulation.

Statistical Survey of the South and Its Separate States

THE SOUTH.

Land Area, 945,088 Square Miles.

	1880.	1890.	1900.	1911.
Population	18,614,925	22,538,751	27,445,457	*33,049,900
Manufactures: †				
Capital	\$329,753,000	\$848,868,000	\$1,408,866,000	†\$2,884,666,000
Products—value	\$622,840,000	\$1,242,581,000	\$1,860,113,000	†\$3,158,107,000
Cotton Mills:				
Spindles	687,066	1,719,600	4,467,383	11,336,898
Looms	14,754	39,445	113,106	239,186
Cotton used, pounds.....	111,777,177	279,728,025	749,915,066	1,143,033,633
Cottonseed Oil Mills:				
Products, value.....	\$6,797,261	\$15,961,090	\$56,269,746	†\$106,292,000
Pig-iron made, tons.....	448,978	1,833,937	2,642,720	3,011,386
Coke made, tons.....	373,982	2,548,245	5,839,612	*9,050,000
Lumber cut, feet.....	3,810,038,000	6,460,984,000	14,444,965,000	†21,235,437,000
Improved farm lands, acres.....	101,975,175	126,995,853	148,254,126	†173,982,000
Farm lands, buildings, value.....	\$2,212,173,481	\$3,161,614,549	\$4,088,564,682	†\$8,971,083,000
Grain, bushels:				
Corn	627,288,000	625,600,000	671,509,000	1,071,862,000
Wheat	84,866,000	60,883,000	130,863,000	121,870,000
Oats	80,515,000	86,098,000	108,693,000	80,105,000
Livestock:				
Cattle	14,189,000	17,769,568	25,224,000	†21,678,502
Sheep	10,365,000	9,601,537	8,652,000	†8,940,300
Swine	21,132,000	20,917,736	23,086,000	†22,675,373
Mineral products, value.....	\$18,225,508	\$60,217,825	\$129,857,303	†\$369,678,060
Coal mined, tons.....	7,002,254	24,925,345	54,510,460	*115,020,227
Iron ore mined, tons.....	702,515	3,516,202	4,748,815	*6,030,000
Petroleum, barrels.....	179,000	498,910	17,102,047	85,000,000
Phosphate, tons.....	190,763	510,499	1,489,907	†2,645,354
Railroad mileage.....	24,866	50,350	61,880	88,903
Exports	\$264,905,753	\$311,742,748	\$484,651,682	\$747,822,348
National Banks:				
Resources	\$194,084,459	\$463,279,488	\$705,827,594	\$1,925,184,627
Capital	\$53,888,930	\$114,817,030	\$106,503,970	\$236,853,850
Individual deposits.....	\$73,124,523	\$212,886,281	\$334,649,680	\$957,428,510
Other banks, deposits.....	\$117,440,491	\$208,219,467	\$346,803,574	\$1,184,045,949
Common school expenditures.....	\$12,471,404	\$24,605,107	\$35,037,993	†\$72,731,604
Property, true value.....	\$9,177,000,000	\$13,756,485,000	\$17,919,200,000	\$27,500,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

UNITED STATES.

Land Area, 2,974,159 Square Miles.

	1880.	1890.	1900.	1911.
Population	50,395,919	62,947,714	75,994,575	*93,960,000
Manufactures: †				
Capital	\$2,790,273,000	\$6,525,051,000	\$9,831,487,000	†\$18,428,270,000
Products—value	\$5,369,579,000	\$9,372,379,000	\$13,010,037,000	†\$20,672,052,000
Cotton Mills:				
Spindles	10,653,435	14,188,103	19,050,952	28,872,000
Looms	225,759	324,866	455,752	685,000
Cotton used, pounds.....	750,343,981	1,117,945,776	1,817,643,390	2,099,718,000
Cottonseed Oil Mills:				
Products, value.....	\$7,690,921	\$19,335,947	\$58,726,632	†\$107,538,000
Pig-iron made, tons.....	3,835,191	9,202,703	13,789,242	23,649,344
Coke made, tons.....	3,338,300	11,508,021	20,533,348	*40,000,000
Lumber cut, feet.....	18,125,432,000	23,494,853,000	35,067,595,000	†40,018,282,000
Improved farm lands, acres.....	284,771,042	357,616,755	414,498,487	†477,448,000
Farm lands, buildings, value.....	\$10,197,096,776	\$13,279,252,649	\$16,614,647,491	†\$34,681,507,000
Grain, bushels:				
Corn	1,717,435,000	1,489,970,000	2,105,103,000	2,776,301,000
Wheat	498,550,000	399,262,000	522,230,000	655,516,000
Oats	417,885,000	523,621,000	809,126,000	873,641,000
Livestock:				
Cattle	34,932,000	50,246,078	67,719,000	†61,225,791
Sheep	42,192,000	35,935,364	61,504,000	†51,809,068
Swine	47,682,000	57,409,583	62,868,000	†58,000,632
Mineral products, value.....	\$364,928,298	\$606,476,380	\$1,107,031,392	†\$2,003,744,869
Coal mined, tons.....	71,481,570	157,770,963	269,684,027	*495,000,000
Iron ore mined, tons.....	7,100,000	16,036,043	27,553,161	*44,000,000
Petroleum, barrels.....	26,286,123	45,823,572	63,620,529	217,000,000
Phosphate, tons.....	211,377	510,499	1,491,216	†2,654,988
Railroad mileage.....	93,262	166,703	194,321	250,000
Exports	\$835,638,658	\$857,828,684	\$1,394,483,082	\$2,049,320,199
National Banks:				
Resources	\$2,105,786,626	\$3,141,487,495	\$5,048,138,499	\$10,443,457,106
Capital	\$466,365,085	\$650,447,235	\$630,299,031	\$1,026,440,500
Individual deposits.....	\$873,537,637	\$1,564,845,175	\$2,508,248,557	\$5,536,042,281
Other banks, deposits.....	\$1,319,094,576	\$2,514,077,249	\$4,780,893,692	\$10,428,283,554
Common school expenditures.....	\$78,094,687	\$140,506,715	\$214,964,618	†\$401,397,747
Property, true value.....	\$43,642,000,000	\$65,037,091,000	\$88,517,307,000	\$135,000,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

ALABAMA.

Land Area, 51,279 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,262,505	1,513,401	1,828,697	*2,172,900
Manufactures: †				
Capital	\$9,668,000	\$46,123,000	\$70,370,000	†\$173,479,000
Products—value	\$13,566,000	\$51,227,000	\$80,741,000	†\$146,431,000
Cotton Mills:				
Spindles	49,432	79,234	411,328	938,368
Looms	863	1,692	8,549	17,050
Cotton used, pounds	7,271,791	14,726,454	67,987,299	112,360,777
Cottonseed Oil Mills:				
Products, value	\$247,982	\$1,203,989	\$2,985,890	†\$8,714,000
Pig-iron made, tons	68,919	816,911	1,184,337	1,712,443
Coke made, tons	60,781	1,072,942	2,110,837	*3,100,000
Lumber cut, feet	251,851,000	586,143,000	1,096,539,000	†1,465,623,000
Improved farm lands, acres	6,375,706	7,698,343	8,654,991	†9,687,000
Farm lands, buildings, value	\$78,954,648	\$111,051,390	\$134,618,183	†\$287,673,000
Grain, bushels:				
Corn	22,679,000	25,390,000	29,356,000	65,970,000
Wheat	1,402,000	1,319,000	916,000	1,630,000
Oats	2,926,000	4,864,000	4,381,000	5,702,000
Livestock:				
Cattle	675,000	778,676	798,000	†931,986
Sheep	347,000	386,380	317,000	†142,925
Swine	1,252,000	1,421,884	1,423,000	†1,266,219
Mineral products, value	\$779,242	\$6,906,439	\$13,701,505	†\$47,751,109
Coal mined, tons	323,972	4,090,409	8,394,275	*15,000,000
Iron ore mined, tons	68,919	1,897,815	2,759,247	*4,100,000
Railroad mileage	1,843	3,422	4,197	5,270
National Banks:				
Resources	\$5,036,764	\$15,866,694	\$19,055,381	\$65,109,958
Capital	\$1,508,000	\$4,294,000	\$3,480,000	\$9,503,870
Individual deposits	\$1,318,889	\$7,024,636	\$10,938,390	\$35,859,233
Other banks, deposits	\$2,269,647	\$1,937,377	\$4,588,607	\$36,505,913
Common school expenditures	\$500,000	\$890,000	\$923,464	†\$2,498,708
Property, true value	\$428,000,000	\$622,774,000	\$774,700,000	\$1,200,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909.

ARKANSAS.

Land Area, 52,525 Square Miles.

	1880.	1890.	1900.	1911.
Population	802,525	1,128,211	1,311,564	*1,604,000
Manufactures: †				
Capital	\$2,953,000	\$14,972,000	\$35,961,000	†\$70,139,000
Products—value	\$6,756,000	\$22,659,000	\$45,198,000	†\$74,818,000
Cotton Mills:				
Spindles	2,015	5,780	9,700	6,808
Looms	28	70	257	164
Cotton used, pounds	340,000	936,360	2,034,273	2,761,056
Cottonseed Oil Mills:				
Products	\$590,000	\$1,881,668	\$3,188,812	†\$7,700,000
Lumber cut, feet	172,503,000	526,091,000	1,595,933,000	†1,844,446,000
Improved farm lands, acres	3,595,603	5,475,043	6,953,735	†8,062,000
Farm lands, buildings, value	\$74,249,655	\$118,574,422	\$135,182,170	†\$308,129,000
Grain, bushels:				
Corn	32,350,000	33,443,000	45,226,000	59,987,000
Wheat	1,356,000	1,575,000	2,689,000	2,236,000
Oats	2,749,000	3,967,000	7,039,000	3,440,000
Livestock:				
Cattle	682,000	938,244	895,000	†1,027,039
Sheep	247,000	243,999	257,000	†144,190
Swine	1,565,000	1,505,214	1,713,000	†1,517,310
Mineral products, value	\$65,535	\$1,130,226	\$2,383,500	†\$5,350,705
Coal mined, tons	14,778	399,888	1,447,945	*2,100,000
Railroad mileage	859	2,203	3,109	5,150
National Banks:				
Resources	\$779,491	\$5,526,862	\$5,244,680	\$30,805,729
Capital	\$205,000	\$1,530,310	\$1,070,000	\$4,510,000
Individual deposits	\$265,382	\$2,235,091	\$3,102,315	\$16,209,712
Other banks, deposits	\$577,628	\$1,107,743	\$4,597,891	\$31,553,892
Common school expenditures	\$287,056	\$1,016,776	\$1,369,810	†\$3,110,164
Property, true value	\$286,000,000	\$455,147,000	\$604,200,000	\$950,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909.

FLORIDA.

Land Area, 54,861 Square Miles.

	1880.	1890.	1900.	1911.
Population	269,493	391,422	528,542	*777,900
Manufactures: ‡				
Capital	\$3,211,000	\$11,110,000	\$33,107,000	†\$65,128,000
Products—value.....	\$5,546,000	\$18,223,000	\$36,810,000	†\$72,724,000
Cotton Mills:				
Spindles	816	.....	.....	.....
Cotton used, pounds.....	166,250	.....	.....	.....
Cottonseed Oil Mills:				
Products, value.....	.....	.....	.....	†\$514,000
Lumber cut, feet.....	247,627,000	411,436,000	788,905,000	†992,091,000
Improved farm lands, acres.....	947,640	1,145,693	1,511,653	†1,803,000
Farm lands, buildings, value.....	\$20,291,835	\$72,745,180	\$40,799,838	†\$117,623,000
Grain, bushels:				
Corn	3,522,000	4,570,000	4,156,000	9,899,000
Oats	436,000	573,000	378,000	432,000
Livestock:				
Cattle	451,000	465,881	751,000	†844,321
Sheep	106,000	98,275	125,000	†113,631
Swine	287,000	374,241	464,000	†808,788
Mineral products, value.....	\$1,500	\$464,706	\$3,326,517	†\$9,284,705
Phosphate, tons.....	.....	46,501	706,243	†2,067,507
Railroad mileage.....	518	2,490	3,256	4,942
National Banks:				
Resources	\$312,335	\$5,603,848	\$9,642,703	\$51,602,027
Capital	\$100,000	\$1,150,000	\$1,155,000	\$6,021,860
Individual deposits.....	\$157,203	\$3,363,953	\$6,435,441	\$29,907,071
Other banks, deposits.....	\$287,289	\$852,739	\$3,714,831	\$24,180,049
Common school expenditures.....	\$114,895	\$516,533	\$765,777	†\$1,714,938
Property, true value.....	\$120,000,000	\$389,489,000	\$355,700,000	\$600,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909.

GEORGIA.

Land Area, 58,725 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,542,180	1,837,353	2,216,331	*2,654,100
Manufactures: ‡				
Capital	\$20,672,000	\$56,922,000	\$89,790,000	†\$202,913,000
Products—value	\$36,441,000	\$68,917,000	\$106,655,000	†\$202,641,000
Cotton Mills:				
Spindles	198,656	445,452	815,545	1,901,110
Looms	4,493	10,459	19,398	38,786
Cotton used, pounds.....	33,757,199	69,139,410	145,833,115	239,900,148
Cottonseed Oil Mills:				
Products, value.....	.....	\$1,670,196	\$8,064,112	†\$17,084,000
Pig-iron made, tons.....	24,394	29,184	67,033	\$38,163
Coke made, tons.....	38,041	102,233	73,928	*30,000
Lumber cut, feet.....	451,788,000	572,970,000	1,308,610,000	†1,041,617,000
Improved farm lands, acres.....	8,204,720	9,582,866	10,615,644	†12,264,000
Farm lands, buildings, value.....	\$111,910,540	\$152,006,230	\$183,370,120	†\$477,603,000
Grain, bushels:				
Corn	21,939,000	31,306,000	34,119,000	73,232,000
Wheat	3,056,000	1,411,000	5,011,000	3,096,000
Oats	6,185,000	5,455,000	7,010,000	7,374,000
Livestock:				
Cattle	860,000	824,818	899,000	†1,077,776
Sheep	527,000	440,459	336,000	†187,589
Swine	1,471,000	1,396,362	1,424,000	†1,780,618
Mineral products, value.....	\$703,078	\$2,817,706	\$3,448,233	†\$6,048,253
Coal mined, tons.....	154,644	228,337	315,557	*150,000
Iron ore mined, tons.....	24,394	244,088	336,186	*300,000
Railroad mileage.....	2,459	4,601	5,730	7,304
National Banks:				
Resources	\$7,849,727	\$15,985,846	\$23,563,136	\$96,975,802
Capital	\$2,221,000	\$3,906,000	\$4,306,000	\$13,956,000
Individual deposits.....	\$2,012,457	\$6,334,808	\$10,864,848	\$47,111,137
Other banks, deposits.....	\$5,910,827	\$14,205,711	\$22,260,235	\$66,260,782
Common school expenditures.....	\$471,029	\$1,190,354	\$1,980,016	†\$4,005,325
Property, true value.....	\$606,000,000	\$852,409,000	\$936,000,000	\$1,570,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909. †Includes Missouri and Texas.

KENTUCKY.

Land Area, 40,181 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,648,690	1,858,635	2,147,174	*2,305,900
Manufactures: †				
Capital	\$45,813,000	\$79,812,000	\$104,071,000	†\$172,779,000
Products—value	\$75,483,000	\$126,720,000	\$154,166,000	†\$223,754,000
Cotton Mills:				
Spindles	9,022	42,942	66,633	84,643
Looms	73	677	991	1,312
Cotton used, pounds	1,882,234	5,751,305	11,971,815	10,301,385
Cottonseed Oil Mills:				
Products, value			4,683,343	†*
Pig-iron made, tons	51,525	47,861	71,562	95,202
Coke made, tons	4,250	12,343	95,532	*150,000
Lumber cut, feet	305,684,000	420,820,000	765,343,000	†753,556,000
Improved farm lands, acres	10,731,683	11,818,882	13,741,968	†14,334,000
Farm lands, buildings, value	\$299,298,631	\$346,339,360	\$382,004,890	†\$633,782,000
Grain, bushels:				
Corn	86,040,000	63,645,000	69,267,000	97,759,000
Wheat	10,565,000	9,152,000	12,443,000	9,804,000
Oats	7,026,000	3,954,000	9,309,000	2,981,000
Livestock:				
Cattle	807,000	1,007,165	1,083,000	†999,553
Sheep	1,000,000	937,124	1,297,000	†1,361,000
Swine	2,225,000	2,036,746	1,955,000	†1,490,316
Mineral products, value	\$1,583,295	\$4,315,997	\$7,102,364	†\$21,512,982
Coal mined, tons	946,288	2,701,496	5,328,964	13,170,227
Iron ore mined, tons	51,525	77,685	52,920	61,000
Petroleum, barrels §		6,000	62,259	500,000
Railroad mileage	1,530	2,942	3,094	3,851
National Banks:				
Resources	\$33,333,221	\$48,962,867	\$65,758,545	\$117,170,275
Capital	\$10,146,500	\$14,853,500	\$12,842,595	\$17,475,900
Individual deposits	\$8,510,630	\$17,188,664	\$27,755,375	\$57,477,510
Other banks, deposits	\$13,501,787	\$27,500,082	\$34,044,105	\$69,857,208
Common school expenditures	\$1,069,030	\$2,140,678	\$3,037,908	†\$4,850,189
Property, true value	\$902,000,000	\$1,172,232,000	\$1,365,100,000	\$1,800,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

†Includes Tennessee. ‡*Included in other States.

LOUISIANA.

Land Area, 45,409 Square Miles.

	1880.	1890.	1900.	1911.
Population	939,946	1,118,588	1,381,625	*1,687,300
Manufactures: †				
Capital	\$11,462,000	\$34,754,000	\$113,084,000	†\$221,806,000
Products—value	\$24,205,000	\$57,807,000	\$121,182,000	†\$223,928,000
Cotton Mills:				
Spindles	6,096	46,200	55,600	45,836
Looms	120	1,200	1,584	614
Cotton used, pounds	644,000	6,006,000	7,282,350	4,541,125
Cottonseed Oil Mills:				
Products, value	\$3,739,466	\$1,573,626	\$7,026,452	†\$4,497,000
Lumber cut, feet	133,472,000	303,591,000	1,113,423,000	†3,733,900,000
Improved farm lands, acres	2,739,972	3,774,668	4,666,532	†5,268,000
Farm lands, buildings, value	\$58,989,117	\$85,381,270	\$141,130,610	†\$233,682,000
Grain, bushels:				
Corn	14,913,000	16,979,000	24,702,000	47,590,000
Oats	405,000	567,000	614,000	777,000
Livestock:				
Cattle	428,000	539,128	670,000	†803,942
Sheep	136,000	186,167	220,000	†178,217
Swine	633,000	569,935	788,000	†1,326,482
Mineral products, value	\$48,000	\$423,125	\$789,219	†\$10,119,993
Petroleum, barrels				10,000,000
Railroad mileage	652	1,740	3,801	5,317
National Banks:				
Resources	\$13,255,603	\$27,999,264	\$33,526,485	\$78,091,924
Capital	\$3,475,000	\$4,325,000	\$3,285,000	\$8,145,000
Individual deposits	\$6,013,173	\$14,783,880	\$20,308,028	\$38,987,786
Other banks, deposits	\$4,719,465	\$8,915,011	\$15,968,225	\$77,373,300
Common school expenditures	\$411,858	\$817,110	\$1,135,125	†\$3,607,295
Property, true value	\$382,000,000	\$495,302,000	\$815,200,000	\$1,400,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

MARYLAND.

Land Area, 9,941 Square Miles.

	1880.	1890.	1900.	1911.
Population	934,943	1,042,390	1,188,044	*1,307,400
Manufactures: ‡				
Capital	\$58,742,000	\$119,667,000	\$163,147,000	†\$251,237,000
Products—value	\$106,781,000	\$171,843,000	\$242,553,000	†\$317,570,000
Cotton Mills:				
Spindles	125,706	158,930	154,064	145,000
Looms	2,425	2,965	2,810	2,300
Cotton used, pounds	24,166,232	27,265,667	39,901,955	29,645,000
Pig-iron made, tons	54,854	147,821	290,073	255,816
Coke made, tons				*250,000
Lumber cut, feet	123,336,000	82,119,000	183,393,000	†154,554,000
Improved farm lands, acres	3,342,700	3,412,908	3,516,352	†3,353,000
Farm lands, buildings, value	\$165,503,341	\$175,058,550	\$175,178,310	†\$240,774,000
Grain, bushels:				
Corn	21,702,000	16,333,000	15,233,000	25,915,000
Wheat	8,487,000	6,208,000	15,188,000	12,322,000
Oats	2,278,000	1,357,000	1,783,000	702,000
Livestock:				
Cattle	240,000	250,123	293,000	†287,751
Sheep	171,000	132,329	191,000	†237,137
Swine	335,000	312,020	318,000	†301,583
Mineral products, value	\$3,731,280	\$6,200,000	\$11,942,000	†\$15,440,207
Coal mined, tons	2,228,917	3,357,813	4,024,688	*5,000,000
Iron ore mined, tons	54,855	35,657	26,223	*14,000
Railroad mileage §	1,040	1,391	1,364	1,609
National Banks:				
Resources	\$50,858,355	\$61,486,309	\$96,669,396	\$162,717,065
Capital	\$13,222,030	\$15,653,750	\$15,122,660	\$17,582,410
Individual deposits	\$21,431,763	\$30,955,946	\$42,941,481	\$81,867,392
Other banks, deposits	\$26,634,263	\$39,094,334	\$69,395,411	\$157,288,130
Common school expenditures	\$1,544,367	\$1,910,663	\$2,803,032	†\$3,748,021
Property, true value	\$837,000,000	\$1,085,473,000	\$1,317,400,000	\$1,850,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

§Includes District of Columbia.

MISSISSIPPI.

Land Area, 46,362 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,131,597	1,289,600	1,551,270	*1,824,800
Manufactures: ‡				
Capital	\$4,728,000	\$14,897,000	\$35,807,000	†\$72,393,000
Products—value	\$7,518,000	\$18,706,000	\$40,431,000	†\$80,555,000
Cotton Mills:				
Spindles	18,568	57,004	75,122	127,108
Looms	644	1,352	2,464	3,016
Cotton used, pounds	2,881,853	8,449,834	10,363,458	14,207,595
Cottonseed Oil Mills:				
Products, value	\$560,363	\$2,406,628	\$6,681,121	†\$15,469,000
Lumber cut, feet	168,747,000	452,797,000	1,202,334,000	†2,122,205,000
Improved farm lands, acres	5,216,937	6,849,390	7,594,428	†8,959,000
Farm lands, buildings, value	\$92,844,915	\$127,423,157	\$152,007,000	†\$330,295,000
Grain, bushels:				
Corn	23,218,000	24,396,000	25,232,000	63,251,000
Wheat	281,000	286,000	41,000	108,000
Oats	3,021,000	4,778,000	2,390,000	3,275,000
Livestock:				
Cattle	655,000	819,201	873,000	†1,010,398
Sheep	288,000	451,779	313,000	†194,280
Swine	1,152,000	1,163,141	1,290,000	†1,287,072
Mineral products, value	\$40,000	\$300,959	\$621,985	†\$840,152
Railroad mileage	1,127	2,471	2,934	4,262
National Banks:				
Resources		\$4,641,451	\$6,557,164	\$23,528,270
Capital		\$1,140,000	\$980,000	\$3,230,000
Individual deposits		\$1,805,955	\$3,878,626	\$12,806,740
Other banks, etc., deposits	\$2,634,915	\$4,321,263	\$12,547,103	\$55,046,343
Common school expenditures	\$830,705	\$1,109,575	\$1,385,112	†\$2,674,648
Property, true value	\$354,000,000	\$454,243,000	\$557,600,000	\$990,000,000

*Estimated. †1909. ‡1910. §Hand-trades and neighborhood industries not included in 1909.

MISSOURI.

Land Area, 68,727 Square Miles.

	1880.	1890.	1900.	1911.
Population	2,168,380	2,679,185	3,106,665	*3,314,300
Manufactures: ‡				
Capital	\$72,508,000	\$189,559,000	\$249,889,000	†\$442,847,000
Products—value	\$165,386,000	\$324,562,000	\$385,493,000	†\$572,085,000
Cotton Mills:				
Spindles	19,312	6,670	13,654	30,304
Looms	431	110	300	722
Cotton used, pounds	3,082,188	1,080,540	2,171,000	6,758,520
Cottonseed Oil Mills:				
Products, value	\$140,000	.....	.....	†\$648,000
Pig-iron made, tons	94,246	89,777	\$.....	\$.....
Coke made, tons .....	.....	6,136	2,087	.....
Lumber cut, feet	399,744,000	395,755,000	723,754,000	†\$501,691,000
Improved farm lands, acres	16,745,031	19,792,313	22,900,043	†\$24,528,000
Farm lands, buildings, value	\$375,633,307	\$625,858,361	\$843,979,213	†\$1,710,505,000
Grain, bushels:				
Corn	160,463,000	175,345,000	180,710,000	213,642,000
Wheat	29,563,000	17,638,000	18,847,000	34,462,000
Oats	25,314,000	24,579,000	24,695,000	12,168,000
Livestock:				
Cattle	2,072,000	2,955,710	2,979,000	†2,556,420
Sheep	1,411,000	950,562	1,087,000	†1,808,038
Swine	4,553,000	4,987,432	4,525,000	†4,429,429
Mineral products, value	\$4,736,280	\$13,794,930	\$13,407,664	†\$52,640,054
Coal mined, tons	844,304	2,735,221	3,540,103	*2,500,000
Iron ore mined, tons	344,819	181,690	41,366	*75,000
Petroleum, barrels .....	.....	278	1,602	.....
Railroad mileage	3,965	6,142	6,887	8,143
National Banks:				
Resources	\$22,620,287	\$100,428,159	\$179,746,530	\$392,779,733
Capital	\$7,200,000	\$22,160,670	\$17,950,000	\$35,990,000
Individual deposits	\$8,391,274	\$45,011,219	\$64,448,555	\$144,840,813
Other banks, deposits	\$33,995,915	\$68,007,841	\$88,660,622	\$284,396,763
Common school expenditures	\$2,675,364	\$5,434,262	\$7,816,050	†\$13,151,365
Property, true value	\$1,562,000,000	\$2,397,903,000	\$3,244,500,000	\$4,500,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909. §Included in Georgia.

NORTH CAROLINA.

Land Area, 48,740 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,399,750	1,617,949	1,893,810	*2,241,400
Manufactures: ‡				
Capital	\$13,046,000	\$32,746,000	\$76,504,000	†\$217,183,000
Products—value	\$20,095,000	\$40,375,000	\$94,920,000	†\$216,614,000
Cotton Mills:				
Spindles	92,385	337,786	1,134,909	3,227,832
Looms	1,790	7,254	25,469	57,041
Cotton used, pounds	11,832,641	53,546,289	190,138,759	335,697,863
Cottonseed Oil Mills:				
Products, value .....	.....	\$529,900	\$2,676,871	†\$6,199,000
Pig-iron made, tons .....	.....	2,841	\$.....	.....
Lumber cut, feet	241,822,000	509,436,000	1,278,399,000	†1,824,722,000
Improved farm lands, acres	6,481,191	7,828,569	8,327,106	†8,800,000
Farm lands, buildings, value	\$135,793,602	\$183,977,010	\$194,655,920	†\$455,715,000
Grain, bushels:				
Corn	36,954,000	36,264,000	29,790,000	55,910,000
Wheat	4,871,000	3,156,000	5,961,000	7,187,000
Oats	5,515,000	6,198,000	5,046,000	3,102,000
Livestock:				
Cattle	607,000	572,711	625,000	†700,208
Sheep	462,000	402,247	302,000	†214,176
Swine	1,454,000	1,251,006	1,300,000	†1,226,307
Mineral products, value	\$575,679	\$836,769	\$1,458,848	†\$2,616,131
Coal mined, tons	350	10,262	17,734	.....
Iron ore mined, tons	2,963	22,873	\$.....	*65,000
Railroad mileage	1,486	3,128	3,733	5,424
National Banks:				
Resources	\$8,420,060	\$10,025,041	\$15,362,182	\$57,708,716
Capital	\$2,501,000	\$2,656,000	\$3,043,500	\$8,185,000
Individual deposits	\$2,883,366	\$4,673,294	\$7,477,058	\$28,558,540
Other banks, deposits	\$1,596,632	\$3,367,909	\$9,280,798	\$45,595,830
Common school expenditures	\$376,062	\$714,900	\$950,317	†\$2,993,045
Property, true value	\$461,000,000	\$584,149,000	\$682,000,000	\$1,100,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909. §Included in Georgia.

OKLAHOMA.

Land Area, 69,414 Square Miles.

	1880.	1890.	1900.	1911.
Population	76,585	258,657	790,391	*1,756,200
Manufactures: ¶				
Capital		\$300,000	\$5,976,000	†\$38,873,000
Products—value		\$429,000	\$10,976,000	†\$53,682,000
Cotton Mills:				
Spindles				5,712
Cotton used, pounds				1,760,930
Cottonseed Oil Mills:				
Products, value			\$874,355	†\$5,180,000
Coke made, tons	1,546	6,639	38,141	
Lumber cut, feet		2,552,000	22,104,000	†164,663,000
Improved farm lands, acres		563,728	8,574,187	†17,496,000
Farm lands, buildings, etc.		\$8,581,170	\$170,804,675	†\$736,473,000
Grain, bushels:				
Corn			14,144,000	46,371,000
Wheat			18,657,000	8,984,000
Oats				7,580,000
Livestock:				
Cattle	546,000	125,328	3,209,000	†1,859,058
Sheep	55,000	16,565	88,000	†59,992
Swine		21,962	1,235,000	†1,737,826
Mineral products, value	\$170,000	785,000	\$2,562,540	†\$32,988,865
Coal mined, tons	120,947	869,229	1,922,298	*2,350,000
Petroleum, barrels			6,472	54,500,000
Railroad mileage	289	1,261	2,399	6,250
National Banks:				
Resources		\$617,846	\$9,283,028	\$90,397,757
Capital		\$310,000	\$2,181,990	\$12,870,000
Individual deposits		\$229,355	\$5,262,842	\$52,540,556
Other banks, deposits		\$129,611	\$3,703,784	\$39,683,943
Common school expenditures			\$686,095	\$83,300,000
Property, true value	\$110,000,000	\$208,050,000	\$811,600,000	\$1,330,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909. §1908.

SOUTH CAROLINA.

Land Area, 30,495 Square Miles.

	1880.	1890.	1900.	1911.
Population	995,577	1,151,149	1,340,316	*1,535,100
Manufactures: ¶				
Capital	\$11,206,000	\$29,276,000	\$67,356,000	†\$173,221,000
Products—value	\$16,738,000	\$31,927,000	\$58,749,000	†\$113,236,000
Cotton Mills:				
Spindles	82,334	332,784	1,431,349	4,109,115
Looms	1,676	8,546	42,663	100,749
Cotton used, pounds	15,601,005	64,000,600	230,053,807	294,455,232
Cottonseed Oil Mills:				
Products, value		\$927,746	\$3,103,425	†\$10,170,000
Lumber cut, feet	185,772,000	197,940,000	466,109,000	†706,831,000
Improved farm lands, acres	4,132,050	5,255,237	5,775,741	†6,085,000
Farm lands, buildings, value	\$68,677,482	\$99,104,600	\$126,761,530	†\$331,833,000
Grain, bushels:				
Corn	11,746,000	16,078,000	13,129,000	45,522,000
Wheat	870,000	750,000	2,143,000	5,632,000
Oats	3,688,000	4,168,000	4,023,000	4,549,000
Livestock:				
Cattle	339,000	242,143	343,000	†388,865
Sheep	119,000	79,421	72,000	†37,433
Swine	628,000	494,696	619,000	†664,475
Mineral products, value	\$794,086	\$3,303,854	\$2,451,086	†\$2,021,371
Phosphate, tons	190,763	463,998	329,173	†179,659
Railroad mileage	1,427	2,289	2,919	3,427
National Banks:				
Resources	\$7,827,604	\$9,724,683	\$11,934,976	\$38,504,212
Capital	\$2,451,100	\$1,798,000	\$2,083,000	\$5,510,000
Individual deposits	\$2,586,177	\$3,511,123	\$5,171,644	\$18,594,088
Other banks, deposits	\$658,812	\$4,842,368	\$8,774,786	\$40,788,447
Common school expenditures	\$324,629	\$450,936	\$894,004	†\$1,905,236
Property, true value	\$322,000,000	\$400,911,000	\$485,700,000	\$860,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909.

TENNESSEE.

Land Area, 41,687 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,542,359	1,767,518	2,020,616	*2,203,300
Manufactures: †				
Capital	\$20,093,000	\$51,475,000	\$71,814,000	†\$167,924,000
Products—value	\$37,075,000	\$72,355,000	\$108,145,000	†\$180,130,000
Cotton Mills:				
Spindles	35,736	97,524	123,896	245,552
Looms	818	2,043	2,995	4,083
Cotton used, pounds	4,944,279	15,779,360	15,040,336	33,263,998
Cottonseed Oil Mills:				
Products, value	\$1,235,000	\$2,504,741	\$2,980,041	†\$5,083,000
Pig-iron made, tons	63,279	267,626	362,190	324,648
Coke made, tons	130,609	348,728	475,432	*320,000
Lumber cut, feet	302,673,000	450,097,000	939,463,000	†1,016,475,000
Improved farm lands, acres	8,496,556	9,362,555	10,245,950	†10,875,000
Farm lands, buildings, value	\$206,749,837	\$242,700,540	\$265,150,750	†\$479,606,000
Grain, bushels:				
Corn	62,470,000	67,692,000	56,998,000	95,390,000
Wheat	7,539,000	7,873,000	11,696,000	10,546,000
Oats	5,849,000	6,486,000	5,810,000	3,627,000
Livestock:				
Cattle	756,000	924,709	912,000	†994,941
Sheep	673,000	540,996	496,000	†793,963
Swine	2,160,000	1,922,912	1,977,000	†1,386,050
Mineral products, value	\$1,115,155	\$4,871,083	\$8,651,904	†\$21,396,784
Coal mined, tons	495,131	2,169,585	3,509,562	*6,500,000
Iron ore mined, tons	63,279	465,695	594,171	*615,000
Petroleum, barrels		(Included in Kentucky)		
Phosphate, tons			454,491	†398,188
Railroad mileage	1,843	2,767	3,185	4,070
National Banks:				
Resources	\$13,390,627	\$34,847,582	\$41,213,509	\$102,057,851
Capital	\$3,005,300	\$9,773,240	\$7,337,645	\$12,435,000
Individual deposits	\$6,588,048	\$15,121,303	\$22,082,775	\$57,972,579
Other banks, deposits	\$3,222,740	\$9,088,121	\$10,957,562	\$51,072,122
Common school expenditures	\$744,180	\$1,526,241	\$1,751,047	†\$3,404,555
Property, true value	\$705,000,000	\$887,956,000	\$956,700,000	\$1,300,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909.

TEXAS.

Land Area, 262,398 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,591,749	2,235,527	3,048,710	*3,992,900
Manufactures: †				
Capital	\$9,246,000	\$46,815,000	\$90,434,000	†\$216,876,000
Products—value	\$20,720,000	\$70,434,000	\$119,415,000	†\$272,896,000
Cotton Mills:				
Spindles	2,648	15,000	48,756	85,682
Looms	71	560	1,018	2,194
Cotton used, pounds	119,986	2,430,000	9,304,434	18,883,153
Cottonseed Oil Mills:				
Products, value	\$276,450	\$3,262,596	\$14,005,324	†\$25,034,000
Pig-iron made, tons	2,232	9,701	10,150	
Lumber cut, feet	328,968,000	839,724,000	1,230,904,000	†1,884,134,000
Improved farm lands, acres	12,650,314	20,746,215	19,576,076	†27,120,000
Farm lands, buildings, value	\$170,468,886	\$399,971,289	\$691,773,613	†\$1,822,713,000
Grain, bushels:				
Corn	66,755,000	63,802,000	81,963,000	96,096,000
Wheat	3,008,000	3,575,000	23,396,000	11,665,000
Oats	6,936,000	11,059,000	28,278,000	18,499,000
Livestock:				
Cattle	3,994,000	6,103,268	9,428,000	†6,721,502
Sheep	3,651,000	3,454,858	1,889,000	†1,758,084
Swine	1,950,000	2,252,476	2,666,000	†2,329,723
Mineral products, value	\$134,640	\$2,359,634	\$5,295,753	†\$18,383,451
Coal mined, tons		184,440	968,373	*1,750,000
Iron ore mined, tons	2,232	22,000	16,881	*30,000
Petroleum, barrels		54	836,039	9,000,000
Railroad mileage	3,244	8,710	9,992	15,495
National Banks:				
Resources	\$5,021,016	\$71,948,401	\$97,763,442	\$340,229,084
Capital	\$1,420,000	\$22,227,260	\$19,618,920	\$49,130,600
Individual deposits	\$2,080,993	\$30,449,724	\$49,749,109	\$178,922,029
Other banks, deposits	\$6,332,751	\$5,839,967	\$2,934,634	\$56,408,457
Common school expenditures	\$1,030,000	\$3,178,300	\$4,465,255	†\$10,289,755
Property, true value	\$825,000,000	\$2,105,577,000	\$2,322,200,000	\$4,100,000,000

*Estimated. †1909. ‡1910. ¶Hand-trades and neighborhood industries not included in 1909.

VIRGINIA.

Land Area, 40,262 Square Miles.

	1880.	1890.	1900.	1911.
Population	1,512,565	1,655,980	1,854,184	*2,084,900
Manufactures: ‡				
Capital	\$26,969,000	\$63,457,000	\$103,671,000	†\$216,392,000
Products—value	\$51,781,000	\$88,364,000	\$132,173,000	†\$219,794,000
Cotton Mills:				
Spindles	44,340	94,294	126,827	383,828
Looms	1,322	2,517	4,608	11,155
Cotton used, pounds	5,087,519	10,616,206	17,832,465	38,496,851
Cottonseed Oil Mills:				
Products, value	\$8,000	.....	.....	.....
Pig-iron made, tons	26,727	292,778	490,617	293,642
Coke made, tons .....	.....	165,847	685,156	*1,400,000
Lumber cut, feet	315,939,000	409,804,000	956,169,000	†1,652,192,000
Improved farm lands, acres	8,510,113	9,125,545	10,094,805	†9,861,000
Farm lands, buildings, value	\$216,028,107	\$254,490,600	\$271,578,200	†\$530,918,000
Grain, bushels:				
Corn	45,230,000	36,922,000	28,184,000	51,408,000
Wheat .....	.....	9,422,000	9,552,000	9,552,000
Oats	5,775,000	6,587,000	5,168,000	3,800,000
Livestock:				
Cattle	631,000	685,763	826,000	†858,185
Sheep	497,000	495,313	693,000	†803,552
Swine	956,000	796,691	946,000	†796,730
Mineral products, value	\$1,263,039	\$3,274,178	\$5,658,801	†\$18,224,987
Coal mined, tons	43,079	784,011	2,393,754	*6,000,000
Iron ore mined, tons	26,727	543,583	921,821	*770,000
Railroad mileage	1,893	3,360	3,795	4,635
National Banks:				
Resources	\$14,348,362	\$24,751,895	\$39,058,368	\$151,931,526
Capital	\$3,066,000	\$4,236,300	\$5,171,000	\$16,843,500
Individual deposits	\$6,690,447	\$14,309,039	\$20,473,458	\$84,653,644
Other banks, deposits	\$7,757,202	\$13,767,424	\$22,451,581	\$49,765,561
Common school expenditures	\$946,109	\$1,604,509	\$1,989,238	†\$4,393,562
Property, true value	\$707,000,000	\$862,318,000	\$1,102,300,000	\$1,600,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909.

WEST VIRGINIA.

Land Area, 24,022 Square Miles.

	1880.	1890.	1900.	1911.
Population	618,457	762,794	958,800	*1,250,600
Manufactures: ‡				
Capital	\$13,883,000	\$28,118,000	\$55,904,000	†\$150,923,000
Products—value	\$22,867,000	\$38,702,000	\$74,838,000	†\$161,960,000
Pig-iron made, tons	62,802	129,437	166,758	291,472
Coke made, tons	138,755	833,377	2,358,499	*3,800,000
Lumber cut, feet	180,112,000	299,709,000	773,583,000	†1,376,737,000
Improved farm lands, acres	3,792,327	4,554,000	5,498,981	†5,482,000
Farm lands, buildings, value	\$133,147,175	\$151,880,300	\$168,295,670	†\$262,458,000
Grain, bushels:				
Corn	17,307,000	13,435,000	19,300,000	23,920,000
Wheat	5,131,000	2,326,000	4,453,000	4,646,000
Oats	2,412,000	1,506,000	2,769,000	2,097,000
Livestock:				
Cattle	446,000	536,700	640,000	†616,557
Sheep	675,000	785,063	969,000	†906,093
Swine	511,000	411,018	443,000	†326,445
Mineral products, value	\$2,484,699	\$8,433,219	\$47,055,384	†\$105,058,311
Coal mined, tons	1,829,844	7,394,654	22,647,207	*60,500,000
Iron ore mined, tons	62,802	25,116	.....	.....
Petroleum, barrels	179,000	492,578	16,195,675	*11,000,000
Railroad mileage	691	1,433	2,485	3,754
National Banks:				
Resources	\$5,939,454	\$9,232,291	\$25,242,824	\$75,680,642
Capital	\$1,861,000	\$2,176,000	\$3,849,660	\$9,362,000
Individual deposits	\$2,040,126	\$5,262,209	\$15,548,823	\$46,866,656
Other banks, deposits	\$4,034,743	\$3,938,249	\$21,317,823	\$60,499,951
Common school expenditures	\$707,553	\$1,198,493	\$2,009,123	†\$4,287,606
Property, true value	\$350,000,000	\$438,955,000	\$659,600,000	\$1,150,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909.

§Included in Virginia.

DISTRICT OF COLUMBIA.

Land Area, 60 Square Miles.

	1880.	1890.	1900.	1911.
Population	177,624	230,392	278,718	*336,900
Manufactures: ‡				
Capital	\$5,553,000	\$28,865,000	\$41,981,000	†\$30,553,000
Products—value	\$11,832,000	\$39,331,000	\$47,668,000	†\$25,289,000
Improved farm lands, acres	12,632	9,898	5,934	†5,000
Farm lands, buildings, value	\$3,632,403	\$6,471,120	\$11,273,990	†\$6,301,000
National Banks:				
Resources	\$5,091,550	\$15,630,449	\$26,205,244	\$49,894,056
Capital	\$1,507,000	\$2,627,000	\$3,027,000	\$6,102,710
Individual deposits	\$2,154,594	\$10,626,082	\$18,210,911	\$24,253,024
Other banks, deposits	\$3,305,875	\$1,303,717	\$11,605,576	\$37,769,258
Common school expenditures	\$438,567	\$905,777	\$1,076,620	†\$2,797,192
Property, true value	\$220,000,000	\$343,597,000	\$928,700,000	\$1,200,000,000

*Estimated. †1909. ‡1910. †Hand-trades and neighborhood industries not included in 1909.

The Story of Progress and Prosperity As Told in Our Advertising Pages by Hundreds of Contributors

A Panorama of Southern Industrial, Railroad and Financial Activities



IN the preceding pages we have attempted to tell the story of the South's upbuilding and to forecast something of its limitless potentialities based on its unequaled natural resources, its geographical location and the energy of its people, soon to be augmented by the activity of many thousands from other sections.

In the following pages are given many concrete illustrations that tell with exceeding clearness of the attractions and the growth of many towns and cities throughout the South. Here are specific facts as to how this town or that city has increased in population and wealth, and how its manufacturing and financial interests have advanced. Climatic advantages of mountain sections and coast towns are set forth, enabling those who want to study about the climate of various altitudes to get into communication with responsible authorities and secure all information desired.

Here are also stories of great water-power operations and of industrial concerns, typical of the character of work now in progress throughout the South.

Leading railroads, which are widely known for the magnificent work they are doing in aiding the South's upbuilding, are here represented.

The specific facts given in the following pages illustrate and emphasize all that is found in the preceding pages. There is not a dull page among them. In them are life and activity; in them several hundred of the most enterprising towns and cities, financial institutions, great manufacturing enterprises and railroad systems tell their individual stories.

Here is a wealth of information—a vast storehouse of facts and figures which should be carefully studied by every reader of this publication.

And when you seek from these concerns further information, which every one of them will gladly send, do not forget to mention the MANUFACTURERS RECORD'S thirtieth anniversary issue.

Water-Power for Coal Mines

Unique Development by Appalachian Power Co. in Southwest Virginia will Transform Entire Section of Country

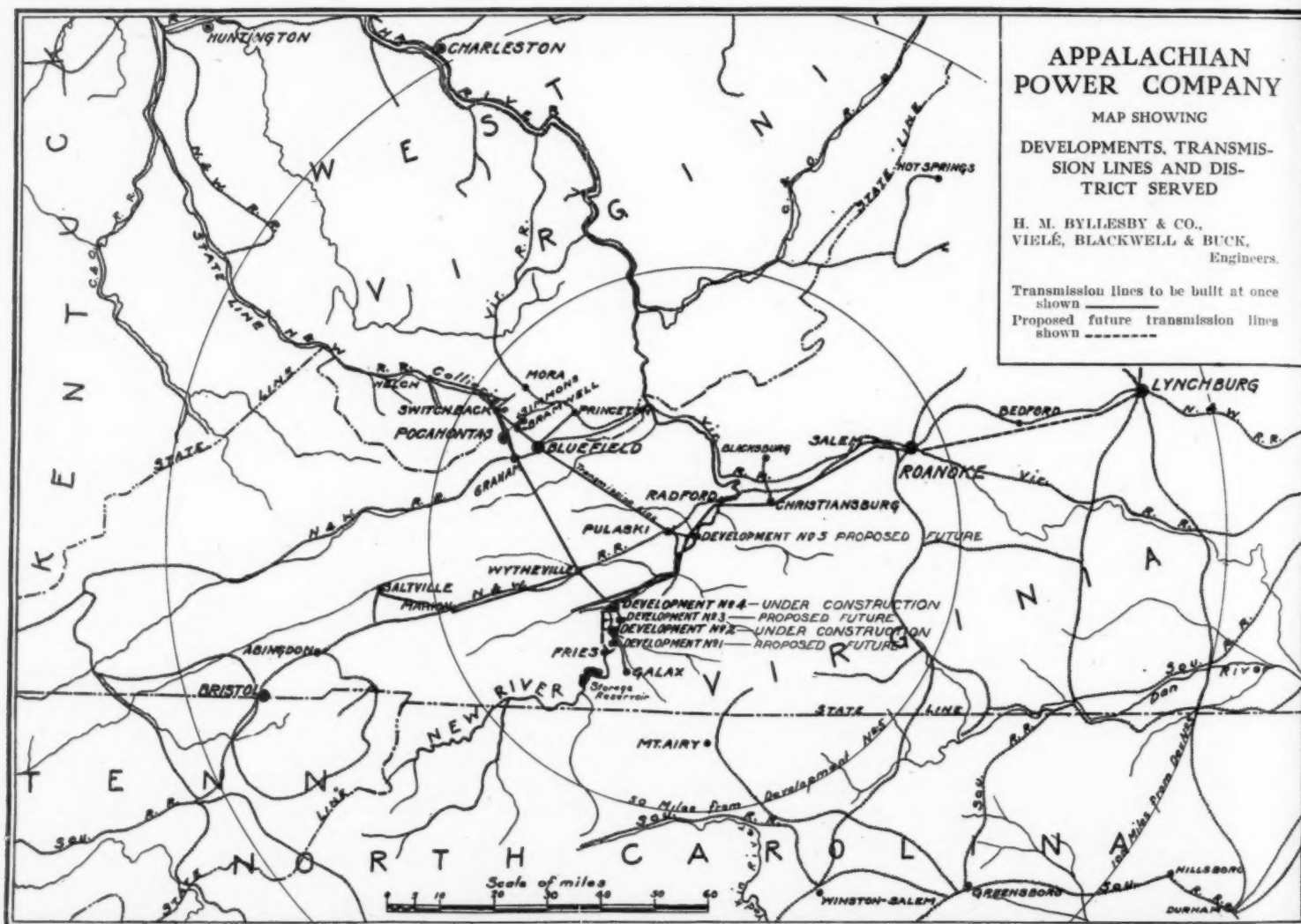


NEAR Pulaski, in Southwest Virginia, with ramifications covering several counties and extending over into West Virginia, the Appalachian Power Co., with \$25,000,000 authorized capital, has under way one of the most unique and interesting hydro-electric developments to be found in the United States today.

This is a territory rich in a great variety of mineral resources. It includes the famous Pocahontas coal fields, which are computed to have a 200-year supply of this high-grade fuel under any probable scale of operation. Around about the development there are iron mines, zinc, copper, salt, gypsum and other minerals, many of which are already developed to a greater or less extent. With the expenditure of the \$6,000,000 present plans call for, power will be provided for more different kinds of industries than any other similar enterprise now serves. In addition to serving power to plants already here, there will be such favorable conditions provided for the operation of electro-

in securing new industries, going out after them whenever occasion arises. Cities and towns will also be encouraged to "brighten up" and to put on an attractive appearance by the proper installation of lights and illuminated signs.

All these features of the possible development in this section will receive the constant care and consideration of the departments under which they come, in spite of the fact that, for the first time in the history of hydro-electric enterprises, power is being developed here for the primary purpose of operating coal mines. Heretofore such use of a commercial plant has been purely incidental. In the Appalachian Power Co.'s case, however, all other uses—albeit of wide variety and great extent—are incidental to the operation of the coal mines, of which there are 109 in this field. There are in these 109 mines approximately 57,000 horse-power in use today, supplied by individual steam plants. The Appalachian Power Co. has already signed up for a service of



chemical industries, plants for the manufacture of aluminum and electrolytic steel, cotton mills, woodworking plants and many other industries that their early establishment would seem to be a foregone conclusion.

With the work already in hand, which is not quite a third of the final contemplated development, the enterprise inevitably means the rapid upbuilding industrially of a large section, the transformation of a region of small cities, towns and hamlets and of sparsely-settled counties into a densely-populated, prosperous community, and even the creation of a new order of civilization. Indeed, the possibilities opened up by the undertaking are well-nigh illimitable, for new life, and vigorous life, is to be fairly pumped into the entire region by the experienced, capable, scientific and financially strong interests who are doing the work.

The Appalachian Power Co. has already acquired the electrical properties, including the electric lighting, railway and power systems, in the towns of Marion, Wytheville, Graham and Pulaski, Virginia, and Bluefield, Cooper, Simmons, Bramwell, Pocahontas, Keystone and Welch in West Virginia. All of these systems will be fed with power from the developments under construction and the steam plants shut down. Incidentally, as showing the influence of the company as a factor in the development of the section, it is of interest to note that the policy of the company is to co-operate with commercial clubs

7500 horse-power, this including the Pocahontas Consolidated Collieries Co., the largest operating company in the Pocahontas coal field. The Appalachian Power Co. will do everything in connection with the operation of this company's plant. Its power will operate the coal-cutting and coal-punching machines; will take care of all car gathering and car haulage; will operate all fans, hoists, larries and tipples, eliminating every other kind of power—steam, mule and hand.

By the terms of this contract, signed July 1, the Appalachian Company will take over the steam turbine plant of the Collieries Company at Switchback, which is in every way a modern station, complete and in fine condition, and with somewhat increased boiler capacity will be used as a reserve or emergency plant after the water-power current is installed.

A contract has been closed with the Roanoke Railway & Electric Co. for the delivery at Roanoke to that company of all the power it now generates by steam.

Among other possible customers at Roanoke are the Norfolk & Western Railway shops, using about 4000 connected horse-power, and a varied line of industrial plants in Roanoke using additionally several thousand estimated horse-power. There is also the possibility of an installation in the railroad shops in Bluefield and for pumping and tunnel fan loads in connection with the same railroad.

In this territory there are 20 iron mines in operation, having something like 2400 horse-power. There are several gypsum mills and alkali works, the various plants using a total of 1800 horse-power. A chemical company, making sulphuric acid, requires 500 to 600 horse-power, and runs continuously, having a 24-hour operation. There are cotton mills, woodworking plants, flour mills, stone quarries and zinc mines among the possible customers in this territory, as is every small manufacturer in any line.

It is the work of the very effective new business department to sign up present users of power and develop new enterprises. The general offices of the Appalachian Power Co. are at Bluefield, W. Va. Under L. G. Gresham, assistant general manager in charge of the new business department, a staff of commercial engineers is maintained at the Bluefield office, whose constant occupation is studying individual cases and demonstrating to all kinds of industries that it is economy to take power from the Appalachian Company. This local effort is supplemented by E. L. Callahan, manager of the new business department of H. M. Byllesby & Co., Chicago, and his staff of experts, who are always ready to give aid and assistance. Thus the new business de-



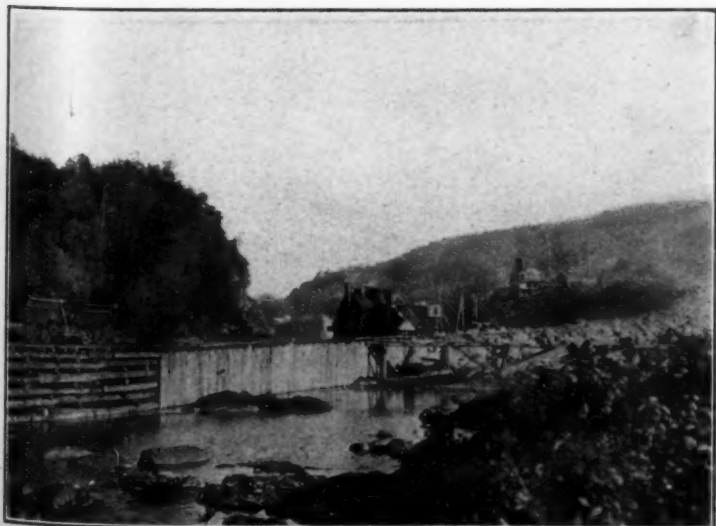
STEAM DRILLS IN ROCK CUT FOR POWER-HOUSE NO. 4.

partment is energetically and convincingly canvassing all the coal operators here with the expectation of ultimately securing practically all of them, and also contracts for other industries are being signed up right along from day to day.

A sliding scale of rates has been adopted, varying in accordance with the consumption, the figures being such as to induce industries from outside to locate along the transmission lines. Already the situation is being looked into by a number of industrial plants to which cheap and reliable power is a factor of importance. Chemical industries is especially a line of enterprise in which it is believed a considerable development may be secured, and the attention of the coming International Convention of Chemical Manufacturers will be called to the situation and their visit to the field will be suggested.

Within a radius of 50 miles of Pulaski there is a present population of 400,000. Within this area are the Norfolk & Western, the Chesapeake & Ohio and the Virginian Railroad, giving ample railroad facilities. The territory is some 200 miles from navigable tidewater and 300 miles from Norfolk, where water navigation is open to all ocean ports. These facts, in conjunction with the inducements offered by the advent of water-power, should greatly accelerate the prosperous manufacturing, mining and agricultural development of the entire district.

The Appalachian Power Co. was incorporated about six months ago under the laws of the State of Virginia. It has acquired five water-power sites in Carroll and Pulaski counties in Southwest Virginia. All of the properties are on the New River. These properties include a fall of over 225 feet, from which over 100,000 horse-power may ultimately be developed. The development will proceed as fast as business requirements warrant.



COFFERDAM AND CABLEWAY LOWER END OF ISLE DAM NO. 4.



ROCK EXCAVATION AT POWER-HOUSE AND CONSTRUCTION PLANT AT NO. 4.

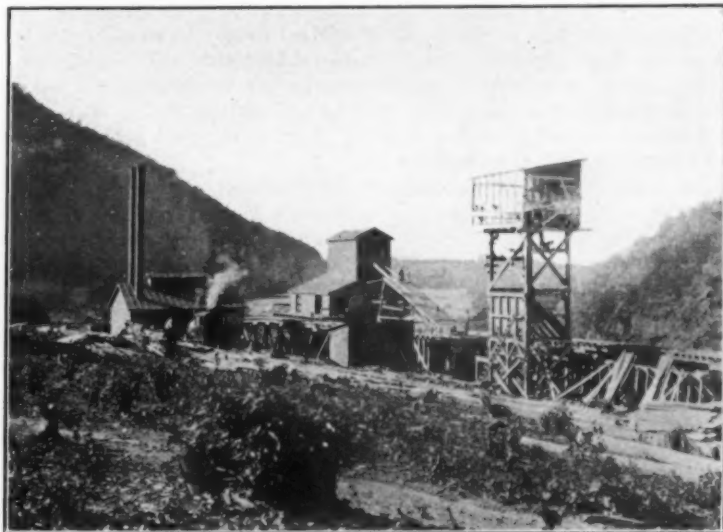
Two plants are now under construction, known as Development No. 2 and Development No. 4. Both dams are to be of concrete. They are located on the New River, about 20 miles from Pulaski, Va., on the Galax branch of the Norfolk & Western Railroad. About 800 men are now engaged in the construction work, with headquarters at the new town of Byllesby, named after the president of the Appalachian Power Co., H. M. Byllesby of Chicago.

Development No. 2 will have a capacity of 20,000 horse-power, under an average effective head of 49 feet.

Development No. 4 will supply 9000 horse-power under an average head of 34 feet.

Plant No. 2 will consist of an overflow dam of maximum height of 50 feet, with a power-house and sluice gates at the west end, near the present Norfolk & Western tracks. On the shore side of the power-house the rock is being cut away so as to give an additional spillway of 200 feet, making, with the dam, a total spillway of 750 feet. Flashboards and Tainter gates will be placed on top of the spillway for the purpose of developing additional head and obtaining water storage. Two sluice gates will be installed in the dam, each having an opening of 6x9 feet.

In No. 2 power-house there will be installed four 6,000-horse-power water-wheels, direct connected to 4,000-kilowatt generators. Each water-wheel unit will consist of a single runner on a vertical shaft, operating at a speed of 116 revolutions per minute. These runners will be ten feet one-half inch in diameter. The generators will supply three-phase, 60-cycle alternating current at a potential of 13,200 volts. The water-wheel and generator rotating parts are on a single vertical shaft with two steady bearings and a roller thrust



MIXING PLANT, BOILER ROOM AND CRUSHER AT NO. 4.

bearing at the top of the generator, which carries the entire weight of the revolving parts.

Continuous current for exciting the alternators will be obtained from 430 horse-power units. Water can be shut off from the main units by structural steel roller gates operated by electric motors. Each of these gates will have an area of 13x21 feet. Outside of the gates is a groove for stop logs and screens. Switchboards for the control of the generators and exciters alone are located in the power-house building.

At Development No. 4 advantage is taken of an island in the river, which permits the power-house to be located at some distance down stream from the overflow diverting dam. The dam will extend from the west bank of the river to the island, giving a spillway 1,000 feet in length, upon which the Tainter gates and flashboards are to be mounted, so as to gain seven feet additional head and increased pondage during low water. The power-house, which closes the channel between the island and the west bank of the river,



BEGINNING OF WORK ON TAIL RACE AT NO. 4.



TAIL RACE AT NO. 4.

will be similar in general construction to that of Development No. 2. At one side will be two sluice gates, each having an opening 6x9 feet.

In No. 4 power-house will be located three 3,500 horse-power water-wheels, each driving a 3,000-kilowatt alternator at a speed of 97 revolutions per minute, generating three-phase, 60-cycle current at a potential of 13,200 volts.

From No. 4 power-house a tailrace is being excavated to a point about 1,800 feet down stream, inside of the island. It is protected by a wing wall from high water in the main channel of the river. Both power-houses are to be constructed of cement and steel, and fireproof.

Developments Nos. 2 and 4, now under construction, are above and below a bend in the river. They are approximately three miles apart by the river, but only a mile apart across the neck of the bend. This permits the current from the two stations to be supplied to a common transformer-house located near Development No. 2. In this transformer-house there will be installed four 6,000-kilowatt water-cooled, oil-insulated transformers, which will transform the currents supplied from the two power-houses at 13,200 volts to the high tension line voltage of 88,000 volts. The operation of the system and load dispatching will be carried on in this transformer-house, all current from the two power plants going directly into this building. In the transformer-house will be installed the high and low tension switchboards and the lightning arresters for all of the transmission lines.

Substations of modern design and construction, for the distribution of power, are to be constructed at various points in the territory to be served. An 88,000-volt substation is to be built adjoining the steam plant at Switchback. It will step down to 13,000 volts, and have 9,000-kilowatt capacity. Another 88,000-volt substation, stepping down to 13,000 volts, with 4,500-kilowatt capacity, will be at Welch. At Bluefield there will be an 88,000-volt substation, stepping down to 2,200 volts, 1,500-kilowatt capacity. At Saltville, where there is a considerable alkali and gypsum development, an 88,000-volt substation stepping down to 2,200, with 8,000-kilowatt capacity, will be built. A substation at Roanoke will be built with 88,000 volts, stepping down to 2,200, with about 5,000 kilowatts capacity.

From the step-up transformer-house an 88,000-volt transmission line connects Developments Nos. 2 and 4 with the foregoing substations. There will be a loop, on which will be Wytheville, Bluefield, Switchback and Pulaski. A single line extends from Switchback to Welch, from Pulaski to Roanoke, and from Wytheville to Saltville, via Marion. There will be 225 miles of 88,000-volt transmission lines.

Radiating from the 88,000-volt substations there will be a number of 13,000-volt loops, 150 miles in total length, serving the coal fields, other in-

dustries and numerous municipalities. Both alternating current and direct current will be furnished the various industries, according to their requirements.

All of the transmission conductors will be of aluminum, those for the low potential circuits being mounted on pin insulators, with the high potential lines supported by insulators of the suspension type.

Contracts for the developments, including the substations, have been generally placed, and practically all of the equipment has been purchased.

The water-wheels are being supplied by the I. P. Morris Company of Philadelphia, and the electrical apparatus in the generating stations is being supplied by the General Electric Company of Schenectady. In the substations the apparatus is being supplied by both the General Electric Company, and the Westinghouse Company of Pittsburgh.

Construction work on the power plants, lines and substations is well advanced, and it is expected that power will be supplied during 1912.

The Appalachian Power Company is being managed and operated by H. M. Byllesby & Company, of Chicago, nationally and favorably known in connection with the successful operation of electric light and power plants. With their operations they serve 194 municipalities, with a total population of over 1,200,000 in eighteen Southern and Western States. They spent two years in most exhaustive investigation of conditions in the territory involved in this development. It is a matter of much gratification in the South that so great an authority on matters of the kind should have become so extensively interested in Southern development work.

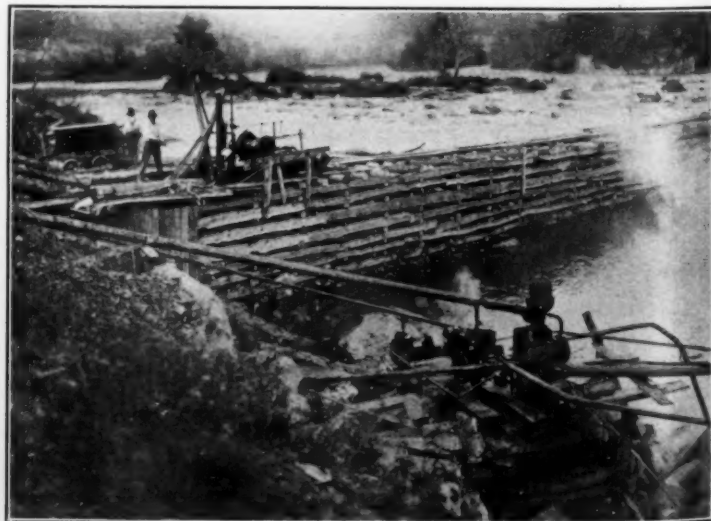
In addition to the management and operation of the enterprise Byllesby & Company are also consulting engineers, supervising the construction work in connection with the steam plants low tension distribution system in the coal fields and various municipalities.

On the ground are H. W. Fuller, vice-president and general manager of the Appalachian Power Company, with headquarters at Bluefield, and D. M. Bunn (of H. M. Byllesby & Company), engineer in charge of construction of the low potential volt lines and sub-stations.

Viele, Blackwell & Buck of New York are consulting engineers, and are in charge of Developments Nos. 2 and 4, and the high tension transmission lines and high tension substations. Viele, Blackwell & Buck have been connected with a number of the largest water-power developments in the United States and Mexico, including three of the plants at Niagara Falls, the plant of the Great Northern Power Company at Duluth; Great Western Power Company, in California; Mexican Light & Power Company, in Mexico; Schenectady Power Company, on the Hoosick River, and a number of other large plants.



COFFERDAM AT NO. 2.



COFFERDAM AT NO. 2.

Central Georgia Power Company



FIVE years ago, "panic year," W. J. Massee and associates of Macon, in control of the Macon Railway & Light Co., generating power to run its street cars with a steam plant, conceived the idea that the Ocmulgee River running southward through Macon, as the confluence of three rivers some sixty miles above, the Yellow, Alcovy and Tussahaw, all having their source in the mountains of the northern part of the State, had some possibilities from a hydro-electric power standpoint. They organized then the Bibb Power Co. with a capitalization of \$200,000, contemplating a modest dam some forty miles above the city of Macon, of capacity sufficient to supply their home town, but chiefly with an eye to getting cheaper locomotion for their own street car line.

Today this little power company has grown into a corporation with a potential market of fully 200,000 horse-power, with present actual development of 24,000 horse-power at one plant on the Ocmulgee at Lloyds Shoals, forty-one miles from Macon, and potential development on two other rivers of 150,000 additional. Their power is being sold now as fast as a big working force can build transmission lines.

This corporation is the Central Georgia Power Co., capitalized at \$7,000,000, \$4,000,000 in common stock and \$3,000,000 in bonds. A large amount of the stock is held in the city of Macon. W. J. Massee is at the head of the corporation, and it was financed by A. B. Leach & Company of New York.

In operation for several months, the Central Georgia Power Co.'s plant on the Ocmulgee, near Jackson, is one of the highest types of electrical engineering and one of the surest earnest of the confidence of capital in the actual present of the New South as well as its future. An immense dam, something over 1000 feet across and 102 feet high, backs up a storage reservoir of 4000 acres with 161 miles of shore line. Its capacity is such that the Ocmulgee River could go dry for several months and the wheels of industry of a score of counties would not be forced to stop. Beside the dam stands a powerhouse ruggedly constructed, 28.3 feet wide, 46.3 feet high and 170.5 feet long. In it is contained electrical equipment of the very latest type and standard of efficiency. Transmission lines, partly double circuit tower pin type and partly single circuit tower pin type, to the extent of 163 miles of single circuit, have been built and are carrying the current to the main centers of Middle Georgia. The Central Georgia Transmission Co., a selling and carrying concern, subsidiary to the Central Georgia Power Co., is now before the State Railroad Commission for permission to issue \$2,000,000 common stock and \$2,500,000 of bonds to build a transmission line from Griffin into Atlanta and sell the power from the Jackson dam in the metropolis of the State, where almost a perpetual power famine obtains.

There is practically no doubt but that this stock and bond issue will be validated by the State Commission within the next few weeks, possibly before this appears in print. This transmission line will be 33 miles long from Griffin to Atlanta and actual work has already started on it. There will be a 9000 K. W. sub-station at Atlanta, with two others at Hampton and Jonesboro. Present plans for the Atlanta extensions include a 5000 horse-power steam plant as auxiliary. This market will be practically unlimited. Griffin and its suburban territory have 12,000 people, a pure manufacturing town.

In addition to 163 miles of equivalent single circuit line now constructed, the company has a 15-mile pole line from Forsyth to Barnesville, a town of 5000 population with big cotton mills. This is the only pole line in operation or contemplated.

The transmission line to Macon is, of course, the big trunk line at present. This runs from the Bibb station six miles from the plant to Forsyth and thence into Macon, a distance of 41 miles. This is a double circuit tower line, and from it now is being sold a total of 8000 horse-power with contracts signed for a total of 11,000 horse-power just as soon as the equipment can be installed. Most of this is in Macon, which market, however, so far is but in the infancy of its development.

Transmission lines are now contemplated; the plans having been drawn up and arrangements being perfected for their construction, to network the entire middle section of Georgia, the most populous and industrially prolific portion of the State, from Atlanta to Macon, bounded on the west by LaGrange and eastward to Eatonton, Covington, Madison and Greensboro, all populous, thriving, growing cotton mill and fertilizer towns.

Toward the west a large and comprehensive line is projected. This will start from Griffin and come south to Barnesville; run from Barnesville to Thomaston, to Manchester, to West Point, to Lagrange, to Newnan and Carrollton. These are all cities with extensive manufacturing interests, besides cotton mills a-plenty.

Another line will run from the dam to Covington, to Social Circle and Monroe, and swinging back toward the dam again by way of Madison, Eatonton and Monticello. This will carry a branch line to Lithonia and Conyers. This is exceptionally populous and highly-developed territory, the towns enumerated being but landmarks on a big circuit, with many smaller places which will eventually become regular power users, bulking up a large power market in the aggregate.

Exclusive of the Griffin-Atlanta extension, this territory opens up an assured market, requiring much more power than the present plant can supply.

Thus when the new stock and bond issue, to be spent in actual development of markets and transmitting the power into prolific territory, which has been waiting for it for years, is issued, the Central Georgia Power Co., which five

years ago was a \$200,000 concern, will be a \$12,000,000 corporation. It already has the market. It is now just a question of building the electric highways to get the power to people all over the biggest and best section of the State, who are hungry and waiting for it.

This has all been done in a comparatively short time, as such organizations go, but it by no means has been an easy task, and is a monument to the men who have perhaps done more to develop or open the way for development of Georgia than any other agency in the State. It was made possible by the indomitable perseverance and unflinching faith in the soundness of his proposition exercised by W. J. Massee of Macon.

When Mr. Massee and his associates formed the Bibb Power Co., as stated before, they merely contemplated generating and transmitting enough power to supply Macon, chiefly the street railway and its lighting and manufacturing contracts.

For a long time there had been talk of interurban lines throughout Middle Georgia. The territory was there, the patronage was there; even a company was organized, with Mr. Massee at its head, to run a line from Macon south to Albany, opening up a great territory. But they couldn't get the power cheaply enough and in sufficient quantities to keep the cars running if they ever did get the line built. Meanwhile the Ocmulgee continued to roll by the doors of Macon with steady, even current and no little volume. Then came the big idea. If enough money could be gotten to build a big enough dam, there was enough water falling far enough to generate enough power to take care of all Middle Georgia without any trouble. This idea came about the latter part of 1906. There followed a winter of unceasing work and never-failing optimism on the part of Mr. Massee. Finally one day in June, 1907, it was announced that A. B. Leach & Co. of New York had agreed to finance a \$7,000,000 power project on the Ocmulgee north of Macon for W. J. Massee and his associates.

No time was lost in getting to work and spending the money. There wasn't much time to be lost. Already there were vague rumors of big Canadian capital, supposedly the McKenzie and Mann interests having fixed a speculative eye on the classic Chattahoochee, far up in North Georgia, near the Tennessee line, with a view to utilizing the far-famed Tallulah Falls. The company which got into the northern part of Middle Georgia first would get the business. The Central Georgia Power Co. got in right away.

Land was bought up for many miles in all directions above the big dam and then the work of construction went on. It was no light undertaking, but something over a year ago it was nearing completion. One year ago the dam was built and a transmission line was completed into Macon February, 1911. The Macon street cars first ran with hydro-electric power. Quickly came the demand from all Central Georgia for power. The more the bondholders and holders of the common stock saw of the proposition, the better grasp their minds got of the fertile and waiting market, the more enthusiastic they became. Then it was that it was decided to branch out and corral all the territory north of Macon as far as Atlanta, including that young metropolis, as far as the market in the latter could be obtained.

The ramparts on the north were to be built so that invasion from that side could be checked if necessary. This northern territory has already shown where every horse-power that can possibly be generated by the Jackson plant is going to.

So now comes the bigger prospect of this young, but now mighty, corporation. Water rights have been secured on the Oconee at Milledgeville, 25 miles east and slightly north of Macon, and on the Flint River at Oglethorpe, 30 miles south and slightly west of Macon, which aggregate a potential horse-power of at least 125,000. With the projected transmission lines north of Macon providing a market for the maximum development of the Jackson plant, and cities to the south of the growing metropolis of the Central State clamoring for power, the Central Georgia Power Co. already is looking to plans for the development of the Oconee and Flint River rights. The city of Dublin, a rapidly-growing place, with the promise of a great future, has asked for power as soon as it can be gotten there, 50 miles southeast of Macon.

A glance at the map of Georgia and the census statistics will show the sort of territory that these two latter projected plants will find their markets in.

The Central Georgia Power Co. has already developed and ramified into a wonderful territory, but its future is even greater. It is in on the ground floor of the most rapidly-growing section of that great and growing South. It has water rights which can develop power sufficient to turn the wheels of a thousand industries and light the homes of a State and to propel interurban cars all over its territory. And it is selling its product now faster, by far, than it can possibly get its transmission lines erected.

In less than 10 years—yes, much less—the Central Georgia Power Co. will be generating and selling 150,000 horse-power. As they say in Georgia, "it has it to do."

The officers of the corporation (with headquarters in Macon) are: President, W. J. Massee; vice-president, J. G. Campbell (A. B. Leach & Co.); vice-president, J. C. Walker, Marshallville, Ga.; secretary, J. C. Murphey, Macon; treasurer, W. Tusch (A. B. Leach & Co.). Board of directors—W. J. Massee, M. H. Massee, J. N. Neel, J. C. Murphey, J. C. Walker, John T. Allen, Walter T. Johnson of Macon, J. G. Campbell, P. G. Gossler and W. Tusch of A. B. Leach & Co., Olaf Ussing of Pittsburgh, and T. F. Wickham of Macon, general manager. L. A. Magraw is chief engineer and superintendent of operation.

Virginia-Carolina Chemical Company



F the many economies secured by the introduction of scientific methods into the ordinary affairs of life, there is probably none of more general or widespread importance than that which has resulted in increasing the productive capacity of soil by the application of carefully prepared commercial fertilizers. Since the time when the memory of man—or his history—runneth not to the contrary it has been recognized as a fact that certain soils were more productive of certain things than other soils that appeared equally fertile, but it is only of comparatively recent years that the real meaning of this fact has been understood. Yet after being demonstrated and explained, it seems so plain that the wonder is its discovery should have been so long delayed.

Plants require for their growth certain elements of soil—nitrogen, phosphorus, sulphur, potassium, sodium, calcium, magnesium, iron, aluminum, manganese, silicon, chlorine—just as all members of the animal kingdom require certain kinds of food to build up tissue, put on fat and maintain life and strength, and when these elements are lacking, either from having been exhausted or from having never existed in the particular soil, they must be supplied, or that soil will not produce plant life. Some of these elements are always present in soils in quantities sufficient for all necessary purposes, but others are more or less easily exhausted, and must therefore be renewed or the value of the soil is gone.

Knowledge of the value of animal excrements to land goes back as far as there is record of agriculture, but while it was known that they would restore fertility, it was not until within a century of the present time that anybody worked out the reason for it.

Farmers have known for many years that certain crops following clover, alfalfa, cowpeas and kindred things yield greater returns than had been taken from the same soil before those things were grown on it, but they accepted the fact and did not stop to ask why it was.

It was known as far back as 1660 that saltpeter would increase the fertility of land—an English farmer at that time left a written story of an application of that mineral and how it had "prodigiously" increased his crops of corn; but it was a hundred and fifty years after that before anybody tried to figure out why it caused the increase.

It was not until 1804, when an investigating Frenchman, Theodore de Saussure, worked out the true significance of the value of ash ingredients to plant life, and pointed out that without them plant life was impossible, that anybody seems to have thought of trying to apply science to agriculture. And it was a number of years after that before advantage was taken of what de Saussure had demonstrated, for while his discoveries were doubtless of interest to other scientists, they made no impression upon agriculturalists, and it was not until 1842 that any practical use was sought to be made of them. In 1840 and 1842 Justus von Liebig, following in the footsteps of the French pioneer, published the result of his investigations, demonstrating so plainly the importance of there being in the soil a sufficient supply of readily soluble mineral substances, that the British farmers were awakened to its meaning and began to take advantage of his teachings. These reports of von Liebig may be said to have laid the foundation for the commercial fertilizer business.

By the middle of the last century it was well understood that potash, nitrogen and phosphoric acid were the necessary constituents of all soils used for agricultural purposes, that they were comparatively easily exhausted, and that they must be restored, else the value of the land was in great measure destroyed. Having discovered that these were necessary to plant life, the next step was to learn how to supply them where lacking, and that, of course, in a manner sufficiently economical to permit of profitable utilization. Chemists began the study of soils and of plants, with a view to learn the constituent parts of the one that are necessary to the production of the other, and to make such combination of those constituents as would bring soils up to their highest possible state of productiveness, and justice to this development could not be done without referring to the wonderful amount of practical information and knowledge which were acquired by the careful actual experiments and tests which were conducted by Gilbert & Lawes (Dr. Gilbert, chemist of the Royal Agricultural Society of England, and Sir John B. Lawes of Rothamstead, England) and the distinguished French agricultural chemist, M. Ville. Soon men began to manufacture fertilizers as a business, and before long the economy of the reinvigoration of exhausted lands by applications of commercial preparations had taken its place among the established facts of agriculture.

After making a start the growth of the commercial fertilizer business in this country increased with great rapidity. In 1859 the output of the factories in the United States amounted to \$891,344; in 1869 to \$5,815,118; in 1879 to \$23,650,795; in 1889 to \$39,180,845; in 1899 to \$44,657,385, and in 1909 to \$114,273,000.

A score of years ago there were in Virginia and North Carolina a dozen or so fertilizer companies doing business in the unsatisfactory and uneconomical way incident to small concerns without well-managed systems of costs and the ability to compare costs of one plant with another. In 1895 some of the men interested in these various competing companies, recognizing the lack of economy in their manner of doing business, began to agitate the matter of getting together and putting their business on a better basis. Accordingly, a meeting was held in Richmond in July, 1895, and the Virginia-Carolina Chemical Co. was formed, the stockholders being for the most part those interested in eight or nine of the original companies. One of the leading spirits in the new organization was Mr. S. T. Morgan, then in the fertilizer business at Durham, N. C., who was elected president of the new company, a position which he has held ever since.

In the beginning the capital stock of the company was fixed at \$2,000,000,

but the business grew so rapidly to proportions beyond the possibility of handling with the money available that in two or three years it was found advisable to increase the stock to \$5,000,000, and this was further increased to \$12,000,000 three or four years later. Still the business grew faster and faster, and four or five years ago another increase in capital stock was found necessary, and this time it was made \$50,000,000.

The Virginia-Carolina Chemical Co. now has a business that completely covers the southeastern section of the United States, and reaches far into the interior, and its annual sales amount to far over a million tons of fertilizer. It has about fifty fertilizer factories, one in almost every Atlantic port from Baltimore to Savannah; a number on the Gulf coast, and others at important inland cities as far west as Shreveport, La.; Memphis, Tenn., and one now under construction at Cincinnati, Ohio. Its factories are thus scattered so as to give good shipping facilities over trunk lines, carrying its products to patrons at the minimum of cost and freight. It has eighteen sales division offices in as many important localities. Its general offices are at Richmond.

The company has its own pyrites mines in Louisa County, Virginia, and Villa Rica, Ga., where several hundred men are employed in getting out the mineral that forms so important a part in the manufacture of fertilizer, and where it operates its own railroad for several miles from the mines to a connection with the Chesapeake & Ohio and Southern Railways. In South Carolina, near Charleston, and at Mt. Pleasant, Tenn., and in Florida, it mines its phosphate rock from its own properties, which are so large that it is probably the largest owner of phosphate rock in the world.

In a thoroughly equipped laboratory a chief chemist and ten assistants are constantly employed in analyzing all materials received and goods produced in order to give accuracy.

But the making of fertilizer, even the best of fertilizer, is not all there is to the business by any means. The fertilizer company, to reap the greatest measure of success and accomplish the greatest amount of good, must be the friend and adviser of the farmer, ready to tell him exactly what to do under the conditions that confront him. The farmer usually is not a scientist, and when he goes to the fertilizer company and tells it that his soil is out of condition and unproductive the fertilizer company must be able to tell what to do to restore it to strength and fertility, just as the physician tells the man what to do for himself when he is weak and ailing. The Virginia-Carolina Chemical Co. has made a specialty of that sort of thing, and through its chemists is prepared to advise what is best to be done under any given set of circumstances. It has become the trusted friend of the farmers throughout the section in which it does business, and when a customer comes to it and relates his troubles, tells what kind of land he has and what he wants to grow on it, not only prescribes the kind of medicine to be used, but gives also the relative quantities of each of its constituent parts, together with the manner in which it is to be administered—the size and frequency of the dose, as it were.

One thing that makes intelligent fertilization of soil imperative is that it builds it up beyond the mere production of one crop, not only retarding retrogression, but starting it on the upgrade toward primitive fertility, whereas the longer it is improperly used in its exhausted condition the harder the work of restoration becomes. For this reason the farmer should carefully consult those whose business it is to know soil needs and to prescribe the remedy. The success with which the Virginia-Carolina Chemical Co. has diagnosed and treated overworked soils, and the confidence it has inspired in those who have taken advantage of its treatment, are fully attested by thousands of letters received from customers throughout all its trade territory.

The officers of the company are: S. T. Morgan, president; E. B. Addison, vice-president; S. D. Crenshaw, secretary; S. W. Travers, treasurer; E. Thos. Orgain, auditor; Charles E. Borden, assistant to the president.

The directors are: E. B. Addison, Richmond; James N. Boyd, Richmond; Harry Bronner, New York City; Fairfax Harrison, Chicago; J. A. Long, Roxboro, N. C.; N. S. Meldrum, New York City; S. T. Morgan, Richmond; Lucien Oudin, New York City; J. N. Wallace, New York City; Henry Walters, New York City; George Watts, Durham, N. C.; T. C. Williams, Jr., Richmond; Kenneth McLaren, Jersey City, N. J.

Great as the fertilizer business has become, it is still in its infancy, for as lands increase in value, and as it becomes necessary for each acre to produce to the maximum of possibility, and as the world comes to realize more and more the economic importance of having each man's labor count for all it can, every effort will be put forth that promises to bring about larger yields in proportion to land and labor utilized, and no element of soil strength will be neglected that in any degree conduces to that end.

And in the constantly increasing business of supplying these elements in the territory in which they will be in most demand, no other fertilizer manufacturing concern in the country occupies a position of equal advantage with that of the Virginia-Carolina Chemical Co., having its factories located throughout the most rapidly growing section of the United States, and having established itself firmly, as it has, and as it will unquestionably continue to do, in the friendship and confidence of the great agricultural population of that section.

In addition to its enormous business of producing raw materials that go into the manufacture of sulphuric acid and fertilizers, this company also, through The Southern Cotton Oil Co., is also one of the largest handlers of cottonseed in the world, from which it produces cotton linters, hulls for feeding livestock of all kinds, cottonseed oil for the highest edible usage (which is imported to Europe to an enormous extent), compound lard, soap, mattresses and comfortables for beds.

Fredericksburg Power Company

THE Fredericksburg Power Company, with its developed electric power of 6000 horse, and its potential power of 25,000 additional horse, installed and now in use at Fredericksburg, Virginia, is doing a good work and will soon turn this erstwhile quiet little city into one of bustling energy and busy activity. This enterprise is the successor of a development undertaken for navigation purposes by the Rappahannock Canal Company a hundred years ago. Vast sums of money were spent in constructing locks, abutments, dams and canals above Fredericksburg and westward up the river, till almost within the shadows of the Blue Ridge Mountains.

Business along the old canal was brisk and prosperous for many years, and until the Orange and Alexandria Railway, later known as the Virginia Midland, and now the Southern Railway, was built in the Piedmont country, and by its greater facilities for transportation gradually drew to itself the business of the canal company. Then came the Civil War with its devastating effect upon this particular section of Virginia—the Flanders of America—and with the fall of the old order of the South went the fortunes which had made this section great and had constructed the many dams, abutments, canals and locks of the Old Canal Company.

Had money been plentiful, 'tis even doubtful whether the power of the river would have been extensively utilized for manufacturing purposes, for the modern days of hydro-electric development, the days of "white coal," were not then dreamed of by the capitalists or engineers of the country. Some substantial effort to develop the power for water-power purposes was made, beginning as early as 1852, and the flour, meal and cloth manufactured at Fredericksburg won, in the markets of the East and South, a merited and enviable reputation, and, in the eighties, one of the largest silk mills in the South, a user of this water power, was erected on the banks of the Rappahannock within the city limits, and has been constantly and profitably run to the present time, and was a scene of busy activity when visited a few days since by a special representative of the Manufacturers Record.

In April, 1904, all the property and rights of both the old Rappahannock Canal Company (1811) and the Fredericksburg Water Power Company (1854) were acquired by the Fredericksburg Power Company, and in October, 1907, all the stock of this latter company was acquired by Mr. Frank Jay Gould of New York, whose abundant means, largely invested also in Richmond and Norfolk, Virginia, has so markedly contributed to the wonderful development of those two progressive Virginia cities.

Mr. Gould immediately put surveyors and engineers to work on the hydro-electric development of the river's power at and above Fredericksburg, as high up the river as the site of the ancient town of Germanna, where Governor Spotswood planted his town and settled the German colonists in the days of the "Knights of the Golden Horse Shoe."

Much land and many additional rights were acquired until now, in the language of the company's title papers, it owns the "entire water power afforded by the flow of the river."

The Electric Generating Company and the Fredericksburg Electric Company were organized, and are also owned by Mr. Gould.

A dam, eight hundred and forty (840) feet in length, of enduring concrete



Company's canal, two miles long, leading the water to the power-house in the city, where, on a fall of 54 feet, 6000 H. P. is developed.

heavily reinforced with steel, was completed in 1910, and this, with the company's 50-foot-wide and two-mile-long canal, entirely completed and in operation, brings the water down into the city of Fredericksburg, where it is passed through the new concrete and steel power-house of the Electric Generating Company, and is converted into 6000 horse power of electric energy, delivered on the switchboard to, and distributed by, the Fredericksburg Electric Company with its "bran" new, but tried and proved distributing lines, supported by reinforced concrete poles. This 6000 horse will be raised to 31,000 horse by the erection of two other dams as the power is sold and used.

Thus Fredericksburg is the business man's and factory man's opportunity.

This tight little city has already four banks, with deposits of \$1,650,000, and furnishing every facility for safe and convenient banking.

It is 55 miles south of Washington and 61 miles north of Richmond, has 26 passenger trains and 30 freight trains a day, connecting it with those cities, and through them with the markets of the nation and of the world. It is

on the direct line between New York and Florida, enjoying all the facilities of travel and transportation of the Atlantic Coast Line Railroad, the Seaboard Air Line, the Richmond, Fredericksburg & Potomac, and of the Pennsylvania lines. It has rail connection with the West, by means of the Potomac, Fredericksburg & Piedmont Railroad and with the Chesapeake & Ohio, and the Southern Railway, main lines at Orange Court House.

With ten feet of tidewater in the river abreast the town and ample wharfage, it enjoys water transportation facilities with the cities of the Atlantic seaboard. Large barges carrying each from 15,000 to 20,000 railroad ties load at its docks for Philadelphia, New York and Boston, and the Maryland, Delaware & Virginia Railway Company operates a splendid steamboat line, with tri-weekly boats between Fredericksburg, Baltimore and Norfolk. Many sailing crafts arrive at and depart from its docks loaded with oysters, fish, pulp wood, grain and lumber.

In the country around the city the soil is good and productive, yielding an abundance of fruits and vegetables, and providing fowls, meat, meal and flour,



The water making its initial plunge over the whole 840 feet. Debris from construction just floating to the force of the rising water.

and while this section is not free from an occasional mild snow or thin ice in winter, yet it is protected on the west by the Blue Ridge Mountains, distant, as the crow flies, about 50 miles, and tempered by the influences of the Gulf stream, which approaches the Virginia Capes about 120 miles east of Fredericksburg. This section, therefore, enjoys a long growing, or out-of-doors, season, a healthy climate, and has an abundance of pure, soft drinking water.

Fredericksburg has not, and never has had, any "negro problem" or any "strikes," or "labor problems," and this statement, while startling, is literally true. Its greatest assets are plenty of cheap, constant electric power, and an abundance of docile, sensible and loyal native labor, uncontaminated by touch with the "walking delegate" and unmixed with the riff-raff of Europe which so often masquerades as the American workingman. The native laborer is not always skilled, but is intelligent, sober, honest, industrious, patient and responsive to instruction from the foreman, or the boss, to whom he owes his allegiance, and is reasonable and content with a steady wage rather than preferring a high one.

Taxes are low, assessments of properties are reasonable; factory sites right along side the railroads, or the river bank, or on the switch tracks are easily and cheaply procurable.

No cotton is raised in this section, but the railroads come to the city directly from the cotton fields, and better than this, the bales of raw cotton can cheaply be freighted from Norfolk, Wilmington, Charleston, Savannah or other Atlantic seaports by steam or sail boats under their own power, from the ocean and Chesapeake Bay up the Rappahannock River to the docks of the city.

Fredericksburg, while 80 minutes' ride by train from Washington, or Richmond, is almost on the edge of the Wilderness country. It is only 12 miles from the battlefields of Spotsylvania, Chancellorsville, Bloody Angle and the Wilderness. This fact is mentioned not to show the historical importance of this tight little city, because Fredericksburg is alive to the present and future, rather than boastful of its historical past, but it is mentioned to show the proximity of the thriving little city to the forest wealth of this wooded country.

In the woods the sawmills are converting the timber trees into ties and lumber; in the city itself, two large planing mills are dressing the lumber for shipment; two large excelsior mills are running 24 hours each working day to load with "wood-wool" and No. 1 and 2 Virginia pine excelsior the railroad cars waiting on the side tracks at the mill doors.

None of this timber, however, is as yet being manufactured into finished articles in the city. Not a lath, sash, door or blind factory, a box, chair or furniture factory is there in or near the city. The people seem prodigal, yea, wasteful, of their natural wealth, and much valuable material in "tie trim," "fitch," slabs, bark-edge boards, cull ties, or lumber, tree "scores" and "laps" is either given away for wood, burned on the sawdust pile, or heaped on the rubbish pile and left to rot.

Mr. Gould, through his heavy expenditures in Richmond, has materially aided in the development of that thriving city, in which values have been multiplied by five in the last five years. Through his like heavy expenditures in Fredericksburg he has caused the Fredericksburg Power Company to be the most potent and helpful agency in the inevitable development of that city.

Fredericksburg and the Fredericksburg Power Company offer the opportunity, and truthfully can and do say to the operative investor "Your Opportunity," while the operative investor can go and see for himself and he will say to himself "My Opportunity."

Alabama Consolidated Coal & Iron Co.



IN the year 1899, Col. T. G. Bush and Fred M. Jackson, two Alabama men of long experience in the coal and iron business, were instrumental in bringing about by the merging of a number of small concerns the organization of the Alabama Consolidated Coal & Iron Company. Abram S. Hewitt of New York, Gen. Samuel Thomas of New York and Richard H. Edmonds of Maryland, three men intimately acquainted with the great mineral resources of Alabama, were among those who assisted in financing the new company.

The company was organized on July 19, 1899, under the laws of the State of New Jersey, with a capitalization of \$5,000,000—\$2,500,000 7 per cent. cumulation preferred stock and \$2,500,000 common stock. T. G. Bush was elected president; Fred M. Jackson, general manager, and John E. Searles, vice-president and treasurer. The original board of directors was composed of Abram S. Hewitt, Samuel Thomas and John E. Searles of New York; J. Wm. Middendorf, Summerfield Baldwin, Douglas H. Gordon and Richard H. Edmonds of Baltimore; T. G. Bush and F. M. Jackson of Birmingham.

The company immediately took over the properties of the Standard Coal Co., Clifton Iron Co., Gadsden furnace and ore properties, Mary Pratt furnace property and the Gate City ore property.

These properties were purchased and consolidated not so much on the basis of "going" concerns as on their intrinsic future value, the original plans of the company involving very large expenditures for development work before full results could be expected. The plans involved the practical rebuilding of three of the four furnaces acquired, the opening of new coal and ore mines and the construction of additional coke ovens, so that the company would have an ample raw material supply for its furnace requirements. Within 18 months after the organization or consolidation all of these improvements had been completed at a cost of \$600,000, and the company had earned a fair surplus after having paid dividends, thus confirming the judgment and wisdom of those who had promoted and financed the company, and giving the assurance so vital and necessary to a new company in the early stages of its growth.

The properties originally acquired embraced 32,211 acres of coal land in Tuscaloosa county, on which were located two mines moderately well equipped with machinery, having an output of about 800 tons per day, and 200 beehive coke ovens; two furnaces at Ironaton with a capacity of 250 tons of iron per day, and a large acreage of brown ore lands immediately surrounding the furnaces; one furnace at Gadsden, with 1800 acres of red ore property within one to two miles of the furnace, and a limerock quarry at Rock Springs, eight miles distant; the Mary Pratt furnace at Birmingham and 1800 acres of red ore lands at Gate City, just outside the city limits of Birmingham.

During the year 1900 the company acquired the coal property now known as the Mary Lee or Lewisburg mines, six miles from Birmingham, containing about 2200 acres of coal land, equipped fairly well with machinery, together with 130 coke ovens and six miles of standard-gauge railroad. Additional coal lands adjoining this property were subsequently purchased, making a total of 3420 acres.

There were also subsequently purchased 2000 acres of brown ore lands at Pryors, Ga., on the Southern Railway, and what is known as the "Attalla ore properties" at Attalla, Ala., near the Gadsden furnaces, containing 1200 acres of red hematite ore lands, and 716 acres of valuable coal lands in Tuscaloosa county, adjoining the company's properties.

The company has expended since its organization and exclusive of the properties then acquired about \$460,000 for additional mineral lands, and at present owns 55,300 acres of mineral lands and 14,600 acres of timber and farm lands, a total of 69,900 acres.

At Ironaton both of the furnaces have been practically rebuilt, No. 1 furnace having been enlarged and equipped with skip-hoist, increasing the combined capacity of these furnaces from 80,000 tons to 110,000 tons per annum.

The Ironaton brown ore is probably the highest grade ore in the State, being low in phosphorus and high in manganese and metallic iron. The well-known "Clifton" brand of pig iron is made from this ore on the Ironaton furnaces. This is a very superior iron, high in manganese, and sells for from one to two dollars per ton premium over the standard Southern foundry irons.

The original Gadsden furnace was a small hand-filled furnace with a capacity of 140 tons per day. This furnace has been completely rebuilt and enlarged, equipped with skip-hoist and all modern conveniences, and now has a capacity of 250 tons per day. A second 225-ton stack has been constructed, equipped in every respect with the most modern appliances, making this possibly the most up-to-date and the most conveniently-arranged two-furnace plant in the South. The "Etowah" brand of pig iron is made at Gadsden, and is a high-grade Southern foundry iron, low in phosphorus, well up in manganese, and enjoys a splendid reputation. A quarter burden of the Ironaton brown ore is used in the manufacture of Etowah iron.

Extensive improvements have been made at Attalla. Etowah No. 1 and Etowah No. 2 ore mines, near the Gadsden furnaces, where the company owns 4338 acres of ore lands carrying a very high grade of red hematite ore 42 inches in thickness.

Also at the Rock Springs limerock quarry, eight miles distant from Gadsden, where the company owns 320 acres, containing an almost inexhaustible supply of high-grade limestone for fluxing purposes, important improvements have been made.

At Brookwood coal mines a new slope has been opened and developed, a new coal washer, bins and trestle constructed, and various machinery, buildings and equipment added. There have also been constructed 115 additional beehive coke ovens, making a total of 315. The famous "Brookwood" smithing

coal is mined at Brookwood, and from which is made the well-known "Brookwood" foundry coke, both of which have for many years been greatly appreciated by the trade, and have no equal in the South, the sales being limited only by the capacity. At Brookwood three seams of coal are worked—the Milldale, Brookwood and Carter—representing a total thickness of 108 inches.

The Searles coal mine has been opened and fully equipped with mining machinery, washer, tipple, bins, buildings, dwellings for employees, water-works, electric plant, 250 modern beehive coke ovens, mechanical coke pulling and loading machinery, etc. In 1909 this plant was destroyed by fire, and was immediately rebuilt on a larger scale, mostly of concrete construction and practically fireproof, at a cost of over \$100,000.

At this mine the Brookwood and Milldale coal seams come together, forming a thickness of 72 inches, affording a cheap mining cost and a large output. This coal makes a splendid blast furnace coke, and the Searles washed nut is a first-class steam coal very much in demand.

The Brookwood and Searles mines are located on the old Standard Coal Co. property, in Tuscaloosa county, embracing 33,000 acres. Practically the entire area carries all of the coal seams found in the Warrior Basin, only three of which, however, have yet been worked—the Brookwood, Milldale and Carter seams, these being the highest coal measures in the Alabama district. These seams have been worked to date on about 700 acres.

At Lewisburg coal mines additional mine equipment, coal washers, bins, trestles, boilers, engines, air shaft, electric plant, haulage system and 220 additional beehive coke ovens, making a total of 350, have been constructed. Also the Mary Lee Railroad, owned by the company and connecting this mine with East Birmingham, a distance of six miles, has been completely overhauled and put in first-class condition.

The Mary Lee seam is worked at this mine, and the coal is 72 inches in thickness. It is of a superior coking quality, and makes an excellent blast furnace coke. In addition to the Mary Lee and overlying it, is the New Castle seam of 42 inches in thickness, and underlying the Mary Lee are the Jefferson and Black Creek seams, each supposed to be 36 inches thick, none of which has as yet been worked. About 400 acres of the Mary Lee have been worked.

On the Gate City property two ore mines have been opened, dwelling-houses, commissary, stables, office building and supply-house constructed. These mines have not been operated extensively, however, for the reason that the company's ore supply has been ample without the necessity for doing so.

This property comprises 1800 acres. The Irondale seam, 48 inches thick, and the Ida seam, 84 inches thick, both good ores, have been worked when an increased ore supply was required. The big seam on this property has not yet been opened. This ore is of a lower grade, but is capable of being concentrated to a very high product at a low cost, and is one of the most valuable ore properties in the Birmingham district.

The company has expended since its organization for permanent improvements \$3,300,000; has set aside and charged off for depreciation \$936,000; has set aside and reserved for exhaustion of minerals to be reinvested in mineral lands \$291,000; has paid dividends on preferred stock, and has accumulated a surplus earnings of \$1,000,000.

T. G. Bush was president of the Alabama Consolidated from its organization until January 1, 1907, when he resigned, and was succeeded by J. H. Hoadley of New York. Mr. Hoadley continued as president until November, 1911, when he was elected chairman of the board of directors, and H. S. Matthews of Birmingham succeeded him as president. The present officers of the company are Joseph H. Hoadley of New York, chairman; H. S. Matthews of Birmingham, president; W. H. Knight of New York, vice-president; C. P. Ludwig of Birmingham, general manager; W. B. Curtis of Birmingham, treasurer, and Wm. R. Sheldon of New York, secretary.

In 1910 it became evident that the company's interests would be promoted by developing and extending its commercial coal and coke trade, thus creating another large source of profit and avoiding the necessity of the company's earnings depending quite so entirely upon the market price of pig iron. The selling force was therefore increased, the capacity of the mines enlarged, and at the instance of Mr. Ludwig screening arrangements were installed at all of the coal mines for the proper preparation of the different grades of coal. As a result, the coal and coke sales have gradually increased until the company now has on its books some of the largest coal and coke contracts in the South.

Profits from these sales during the past two years have greatly increased the company's earnings at a time when the price of pig iron has afforded only a small profit from that source.

In order to further extend this desirable and profitable coal and coke trade, the company proposes to open additional mines on its 33,000 acres of coal lands situated in the very heart of the Warrior coal field, and within a short distance of the Warrior River. This is of special importance, in view of the fact that the Government will in a few months have the Warrior River ready for navigation, and coal may be barged down the river to Mobile, New Orleans and all along the Gulf Coast at a very cheap transportation cost.

The company owns a large acreage of high-grade brown ore lands as yet undeveloped, notably the Hematite, Ga., property, comprising 2000 acres, where the deposit has been quite thoroughly proven. Developments on these lands have not been necessary, as the Ironaton brown ore mines have furnished ample ore for the furnace requirements, and should continue to do so for a great many years to come.

A large portion of the company's property is covered with long-leaf pine and all kinds of hardwood timber, which can at any time be marketed very advantageously.

The company's plants are all in good condition, and the tonnage produced during the year 1911 broke the record of all previous years.

Shelby Iron Company, Shelby, Ala.

SHELBY, Ala., lies almost exactly at the geographical center of the State. It is in the southern portion of Shelby county, in the Piedmont section of Alabama. To the northward the country rises slowly until it blends into the low southwestern extension of the Blue Ridge Mountains, while to the south and east of the town lies the drainage basin of the Coosa River.

It is surrounded by an industrious farming community for which Shelby has for years been the trading center. Prior to the construction of the Alabama Mineral Division of the Louisville & Nashville Railroad in 1890 the cotton raised on the farms for several miles to the south and east was marketed at Shelby and hauled to the Southern Railway at Columbiana over a branch road owned and operated by the Shelby Iron Co. This road was known as the Shelby Iron Co.'s railroad.

Shelby is located on rolling, well-drained ground, and has many pleasant homes, the location being attractive to those desiring a mild climate.

The business houses and dwellings owned by the company are of the best construction, well cared for and attractive, both as to design and location.

The company maintains a modern hotel, electric lighted, open fireplace and running water in every room.

The charcoal-iron industry at Shelby, Ala., began in 1844, when Horace Ware, its founder, decided that, because of the character of the large ore deposits there and the quantity of timber available, Shelby would be a good place to make charcoal iron.

In 1846 Mr. Ware completed his first furnace, a 30-foot brick and stone stack on a wood foundation, having three tuyeres and a daily capacity of about five tons of cold-blast iron.

From the ore bank, immediately back of the furnace, select lump ore was mined and freed from the adhering clay by hand. One mule and a cart hauled all the ore that was required. From this beginning Shelby has led in the progress of charcoal iron-making in the South to the present time, making only such changes, mechanically and metallurgically, as would make it possible to produce more iron of the grades and quality demanded by highly discriminating melters.

Early in its history "Shelby iron" acquired a reputation, due to its purity and the care with which it was made. It was better liked, as the records show, than other irons made in Alabama, Georgia and Tennessee.

Comparative tests of Shelby iron with irons from these two States were made at Columbus, Ga., in 1852, resulting in an order being placed with Mr. Ware for 1000 tons—the largest order ever placed in Alabama up to that time.

In 1854 a small puddling furnace was built. Wrought bars from the furnace were sent to Sheffield, England, in 1856 and made into cutlery, including razors. It received the highest endorsement by English steel manufacturers.

A rolling mill of about 12 tons capacity was completed in 1860, the first rolled bar iron being made on April 11 of that year. This mill had two single and two double furnaces and two heaters, with muck and finishing rolls. The first cotton ties made in the South were made here, and later armor plates were made. The largest plates were about 30 inches wide, and, it is stated, the gunboats Tennessee and Merrimac were protected by Shelby plates.

In 1863, to meet the demands of the Southern Confederacy, a 30-ton brick and stone stack was built, which was the first furnace in the South to be equipped with warm-blast pipe stoves. During the Civil War the Confederate Army used all the iron made at Shelby, and enlisted men were detailed to work at the furnace and mills.

The entire equipment at Shelby was demolished by Colonel Black, U. S. A., at the time of "Wilson's raid" on April 15, 1865. The owners, however, rebuilt the furnace plant and blew in on January, 1869. This was designated as No. 1 furnace.

In 1873-74 the present No. 2 furnace, 70 tons capacity, was built and blown in on January, 1875. This furnace is in blast at this time and has a remarkable record as an ironmaker.

On April 9, 1889, No. 1 furnace was blown out, ending its fifteenth blast. The stone and brick stack was removed, and the present 75-ton-capacity furnace was built and blown in on November 25 of the same year.

During the summer of 1911 a new dust catcher of the latest design was installed, also an improved type of water-cooled steel bosh jacket, and a new double battery of Durham type warm-blast stoves erected for better utilization of furnace gases.

The old underground gas main was replaced by a 54-inch overhead steel gas main provided with ample dust legs and facilities for cleaning out any accumu-

lations of dust. This main is brick lined and connects both furnaces with all the boilers as a conduit for available gas from either or both furnaces.

The plant is equipped with standard makes of water-tube boilers, furnishing steam for three blowing engines, the machine shop and auxiliary pumps and engines. The plant is now one of the best equipped warm-blast charcoal-iron plants in the United States. The combined capacity of the furnaces is 50,000 tons per year.

In addition to the two furnaces, there is a foundry equipped for making castings up to 3000 pounds and a machine shop amply equipped for general machine work. These take care of all repairs and renewals at the furnace and mines and also turn out a liberal amount of custom work.

The ore used is mined from the deposit adjoining the furnace. It is brown ore of the limonite variety, high in combined water. It is low in phosphorus and sulphur, and high enough in manganese to make a very strong, tough iron, with an iron content above 50 per cent. It is mined with steam shovels, washed in log washers and roasted with producer gas to drive off free moisture and sufficient combined water to effect a primary rupturing of the ore before charging. The yearly requirements for both furnaces is approximately 100,000 tons.

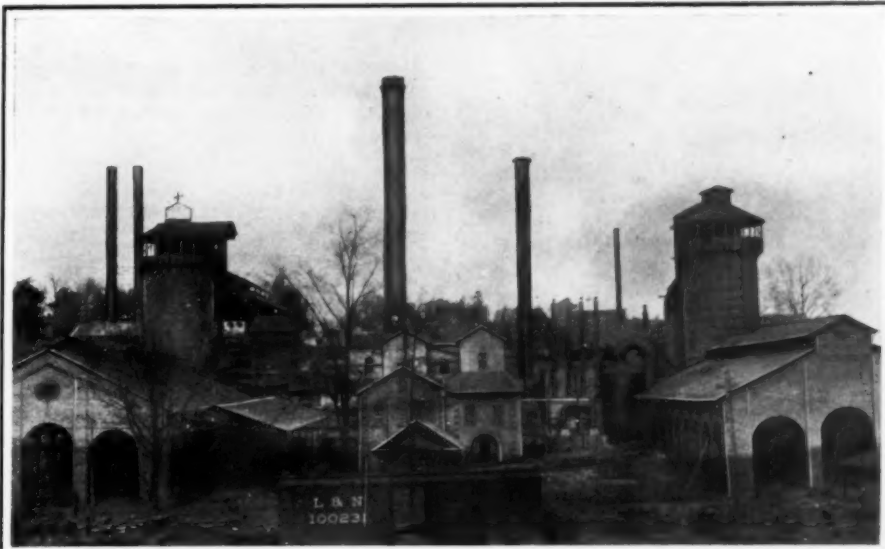
Mining so far has been confined to the upper levels or benches of the main deposit. Recent prospecting shows that the ore extends to a depth of at least 100 feet (the limit of the drill) below the bottom of one of the largest cuts, which will be available for future operations.

The charcoal used is made from Southern pines and hardwoods, and when properly charred it is relatively high in carbon and strong of structure. The yearly requirements for both furnaces is approximately 6,000,000 bushels.

The iron made is of the different grades and analyses demanded by the trade. It is above the strength of other charcoal irons of the same grades, and

is acknowledged to be the choicest of the Southern irons. The numbers, or grades, are the usual ones demanded by the manufacturers of car wheels, chilled rolls, special castings and wrought irons requiring iron of special purity.

The company has long enjoyed the patronage of railroad companies, car-wheel makers and manufacturers of machinery, who have learned from long experience that they can depend upon Shelby iron to meet their expectations. The many orders received recently from new customers speak for the continued popularity of Shelby iron. The company owns approximately 45,000 acres of timber, mineral and farming lands, and operates charcoal coalings at various points in Alabama.



FURNACE PLANT SHELBY IRON CO., SHELBY, ALA.

Five stores are operated, the one at Shelby, managed by Mr. Charles L. McDaniel, being the main distributing point. This is a general store of the higher order, resembling a department store in the variety and completeness of the various lines of merchandise handled. Here goods are sold on a competitive basis with other stores in Shelby, the operatives having every advantage enjoyed by the general public. The policy of the company has been such as to develop most cordial relations between the company and the surrounding community, the space around the company's general store at Shelby on certain days of the week resembling the market day in the main square of some Southern towns of much greater population.

The industry was first incorporated by Horace Ware February 4, 1856. He retained the sole ownership until March 18, 1862, when he sold a controlling interest. Later transfers of stock placed the management in 1867 in the hands of Connecticut men, with headquarters at Hartford. The present president, Ward W. Jacobs of Hartford, was early connected with the management and served the company as president first in 1888, succeeding Newton Case, also of Hartford, who had been president for 20 years prior to his death.

In 1890 Col. Thomas Greene Bush of Mobile, Ala., was made president, filling that office until his death in Birmingham on November 12, 1909. Following the death of Mr. Bush, Mr. Jacobs was again made president, and has since directed personally the affairs of the company. Mr. Jacobs has been continuously one of the directors of the company for 26 years.

The general officers of the company are, in addition to Mr. Jacobs, Benaiah Y. Frost of New York, vice-president, secretary and treasurer, and Arthur H. Avery, assistant treasurer, who has been with the company in Shelby for 26 years.

The operations at Shelby are in the hands of Joseph W. Keffer, manager, formerly of Pittsburgh and New York, a man who has had 22 years of experience in the iron business. He is assisted by Linn W. Searles of Birmingham, consulting engineer, who designed and directed the improvements made at Shelby during the past year.

The cut shown on this page is from a photograph of the plant at this time.

The Fidelity & Deposit Company of Maryland



HERE is nothing more interesting than the story of an enterprise, small in its beginning and undertaken under circumstances of difficulty and discouragement, but carried ultimately by intelligence and grit to a magnificent success. Such a story appeals to our love of bold adventure and stirs the blood. And its interest is enhanced, if the successful enterprise, not terminating in one brilliant achievement, becomes a permanent institution and extends its influence widely over the world, facilitating economic progress and benefiting directly and indirectly many thousands of people.

The history of the Fidelity and Deposit Company of Maryland is a recital of this kind. What it deals with, it is true, is modern competitive business, corporate, expanding, profitable—an extremely practical thing—but the story of its origin and development reads like romance. This is largely due to the fact that the founders of the company, animated by ideals of fair dealing as well as courageous devotion to their undertaking, exhibited a sentiment of regard for the public good which lifts their work above the plane of mere self-seeking. Their work was constructive and creative, not parasitic and predatory. They did not reap where others had sown, but were themselves the sowers. They made two blades of grass grow where none had grown before.

ITS FOUNDING.

The Fidelity and Deposit Company of Maryland was incorporated February 15, 1890, under the general incorporation laws of Maryland. By an act of the Maryland legislature, signed by the Governor April 3, 1890, the company's powers were enlarged and it was authorized to undertake every kind of suretyship. It began business in May, 1890, at No. 7 North Calvert street, Baltimore, with a subscribed capital of \$250,000, of which \$25,000 was paid in. The company had been organized April 23 by the election of officers and directors.

EXTENSION.

There were at this time in the United States but two companies doing a purely surety business, namely, the Guarantee Company of North America, a Canadian corporation operating on English lines, and the American Surety Company of New York, organized in 1884. The former limited its guarantees to officers and employees of banks, railroads and other corporations; the latter occupied a wider field, guaranteeing bonds of contractors and fiduciaries and bonds furnished in court undertakings. Neither undertook to bond public officials of the various States, of municipalities or of the national government. There was, accordingly, in Mr. Warfield's opinion, a wide and inviting sphere of activity for a new company. At this time, it is true, no corporation had been accepted as surety by any court of Maryland, or upon the bond of any public official. It was necessary for the Fidelity and Deposit Company, in order to get the business it chiefly coveted, to educate the public, not in Maryland only, but in all the States, to a proper appreciation of the superiority of a reliable corporation's guarantee to that of an individual. It was an immense task, in the prosecution of which the Fidelity and Deposit Company was the pioneer. It was the work of years to open people's eyes fully to the advantages of corporate surety. Most of the States were without laws permitting the acceptance of surety companies upon the bonds of public officials and the United States Government had not authorized it.

DETAILS OF PROGRESS.

It was evident that for continued growth of its surety business the company must look beyond the borders of Maryland. Outside agencies were indispensable. The first were established in 1891 at Washington, D. C., and Louisville, Ky. In the following year provision was made for getting business in the West, in Tennessee, Mississippi, Louisiana, Arkansas, Texas and Alabama. The South was had especially in view. Already in 1892 the business obtained outside Maryland in the fidelity line exceeded that done in the home State. In 1893 agencies were established in Massachusetts, Rhode Island, Connecticut, Pennsylvania, Georgia, Florida, South Carolina, Illinois, Minnesota and Colorado, and in 1894 in 16 other States, including Virginia, New York, Ohio and Missouri. The number of agents in 1894 was 300, and the company was doing business in 36 States. In 1912 the company has agencies in all the States and also in Austria, Cuba, England, France, Germany, Hawaii, Holland, Ireland, Jamaica, the Philippine Islands, Porto Rico and Scotland. The number of its agents and attorneys at present is 4473.

WHAT SURETY IS.

Suretyship is a variety of insurance. It provides against what business men call "the moral risk"—the possibility that an employee, trustee or contractor may fail to keep his engagements. The prudent man provides against the uncertainties of life by life insurance and against fire risks by fire insurance. It is but an extension of the idea to avert the hazard arising out of the fallibility of human nature by exacting from one who seeks a position of trust or a contract a bond with good security for the faithful performance of the obligations undertaken. Formerly individuals were asked to "go security" for friends or relatives, often with disastrous results. "Security debts" were the ruin of many families. The modern surety company relieves society of this peril.

THE NECESSITY OF SURPLUS AND RESERVES.

The Fidelity and Deposit Company of Maryland from the beginning recognized the necessity of strength. Its first annual statement, April 30, 1891, showed a net balance of profit on the operations of 10½ months of \$21,998.54. Of this balance \$20,000 was carried to surplus and the rest to profit and loss.

†In 1900 there were 10; in 1912 about 60.

No dividend was paid, and in 1894 it was decided by the directors to pay no dividend till the surplus reached \$500,000 and net assets \$1,000,000. No dividend was paid, in fact, till 1896, after the capital stock had been increased to \$1,000,000 and the surplus and reserve aggregated nearly the same sum. In the following year the surplus was \$1,065,434.64 and the reserve \$435,089.69. The policy of attaining commanding strength of capital, surplus and reserve was steadily maintained in subsequent years, so that at the end of 1911 the capital stock was \$2,000,000, the surplus \$2,318,481.42 and the aggregate of various reserves nearly \$3,000,000.

A large capital is very well, but the management of the Fidelity and Deposit Company of Maryland holds that the strength of a surety company lies in its surplus and reserves, since the capital cannot be used to meet losses. The margin of safety is the extent of the surplus and reserves.

THE FIDELITY BUILDING.

The management of the Fidelity and Deposit Company always held the opinion that its best asset would be a handsome, well-situated building. Real estate has always been considered by the courts and other approving authorities as the best basis or foundation for suretyship. Accordingly as early as September, 1890, a committee was appointed to select a suitable site for the future home of the company, and the Fidelity Building was completed in 1894.

In 1911 the Fidelity Building had seven stories added to it, making 15 in all. A large new building, uniform with the old in material and style and 15 stories high, was added on the north and west sides, increasing the capacity of the Fidelity and Deposit Company's home from 84 to 350 offices. The old building had 40,000 square feet of floor space; the new, 140,000 square feet, corridor space not being included in the 140,000 square feet.

THE FIDELITY TRUST COMPANY.

During its first years—up to 1904—the Fidelity and Deposit Company did a banking business as well as a surety business, receiving deposits subject to check, paying interest on balances, issuing letters of credit, acting as fiscal agent, etc. In 1905, however, the banking business of the Fidelity and Deposit Company was transferred to the Fidelity Trust Company, a different and distinct corporation. The surety company and the trust company together, with aggregate resources of \$16,854,804.78, constitute the largest financial aggregation under one head in the South. It is now creating an investment department which will look into Southern conditions and facilitate the making of safe investments in that section.

The trust company has grown rapidly in public favor, having every facility for handling all kinds of banking and trust company business. The statement of its condition December 31, 1911, shows resources aggregating \$1,892,362.70, consisting of capital \$1,000,000 and surplus and undivided profits \$892,362.70, invested in gilt-edge securities. The banking department had deposits of \$6,829,441.51. Capital stock, surplus and undivided profits, together with deposits, aggregated \$8,721,804.21.

THE FOUNDER OF THE FIDELITY AND DEPOSIT COMPANY.

No account of the origin and development of the Fidelity and Deposit Company of Maryland would be complete without a sketch, however brief, of the career of former Governor Warfield, president of the Company, its founder and guiding spirit from the beginning to the present time.

Born May 7, 1848, at "Oakdale," Howard County, Maryland, of a Colonial family of ancient date, Mr. Edwin Warfield got his education in the public schools of his county. With his resources impaired by the emancipation of his father's slaves, he earned his first income at the age of 18 by teaching, at the same time studying law. Possessing personal magnetism in keeping with his genial sympathies and pleasant manner, he speedily won influence in his county and was made Register of Wills in 1874, at first by appointment and afterward by election for a term of six years. In 1881 he succeeded A. P. Gorman in the State Senate, was re-elected in 1883 and became President of that body in 1886. From May, 1886, to May, 1890, he was Surveyor of the Port of Baltimore, by President Cleveland's appointment, having resigned the office of Chairman of the Democratic State Central Committee, in recognition of the President's well-known objection to the participation of Federal officials in politics.

In 1901, after the company was firmly established, Mr. Warfield turned his attention to public affairs, and in 1903 was elected Governor of Maryland. He announced his candidacy in 1901, a year and a half before the election, without consulting the party bosses, and won the nomination by general consent of the people.

A PUBLIC INTEREST.

The benefits of corporate suretyship may be regarded from a higher point of view than that of the stockholder or the local beneficiary. Corporate suretyship bridges over a chasm which has heretofore stopped the progress of many a man and destroyed his career. It does this by guaranteeing the integrity of the honest, capable man, enabling him thus to obtain employments and positions he could not otherwise attain. Many honest and capable men have failed because discredited always hopelessly by poverty. Corporate suretyship here enters to prevent poverty from barring the way. It puts a premium upon integrity and declares itself willing to risk money upon it. In doing this it builds its foundations deep in the inherent honesty of the normal man upon which rests the entire fabric of commercial, social and political life. Optimism rather than pessimism is the basis of the surety company's philosophy. It assumes that the rectitude of man is not always a hollow sham, but is often, nay, oftener, an indisputable, dependable fact.

Frank A. Furst as a Leader in Canal Building and Other Large Works of Construction

BALTIMORE is a city with a distinguished past and with an enduring vigor which ensures it a great future. It has individuality—a strongly marked character of bold enterprise tempered with a conservatism. It boasts a long roll of ship-builders, ship-owners, sailors, railroad men, inventors, manufacturers, merchants, bankers, educators and resourceful politicians. It has been first among American cities in many lines of endeavor. It led in the inauguration of the steam railway and the telegraph; in the application of steam to trans-Atlantic transportation; in electric traction; in the use of the best type of printing press and in the production of the linotype machine—inventions which have altered the aspect and character of modern civilization. Its atmosphere favors optimistic endeavor. Baltimore capital has financed a large proportion of the public improvements undertaken in the South and West, and Baltimore contractors, possessing exceptional enterprise and acumen, have played a large and growing part in the construction of important public works.

Prominent among Baltimoreans who have engaged in recent years in engineering enterprises of great magnitude is Mr. Frank A. Furst, whose varied undertakings and achievements place him with the greatest *entrepreneurs* the United States has produced. He is of the limited class of men who do things—big things—and do them constantly with an ease and readiness which implies the possession of intelligence and executive ability of the highest order. The successes organized and achieved by Mr. Furst reflect honor upon the section with which he is identified, and in sketching here his work and personality we present him as a type of which Baltimore and the whole South have a right to be proud.

Mr. Furst's present operations include the cutting of a canal at Cape Cod, to shorten the water distance between Boston and New York and eliminate the perils of navigation around the Cape; the dredging of hundreds of miles of canal through the Everglades of Florida, with a view to reclaiming 7,000,000 acres of fertile land; the excavation of four miles of the Erie 1000-ton barge canal near Utica, New York; the large task of building abutments for a bridge over the canal for the New York Central & Hudson River Railroad at Sterling Creek, New York; the development of a great business in sand and gravel, shipping 500,000 cubic yards of this material yearly from the Patapsco River, near Baltimore, to Florida, for use in concrete work, and the organization of a company to build barges, scows, and perhaps other vessels of concrete. These undertakings might be supposed to suffice to occupy fully the Furst-Clark Construction Co., of which Mr. Furst is president, but the company is engaged also in contracts for dredging fifteen rivers of the Eastern Shore of Maryland, the angles of the Baltimore ship channel, a long stretch of James River, the harbor of Norfolk and Thimble Shoals, near Fortress Monroe—contracts involving the removal of 9,000,000 cubic yards of material.

The Cape Cod Canal and the drainage of the Everglades are enterprises of gigantic proportions and formidable character. They are undertakings which others have repeatedly attempted, but failed to accomplish. Their practical engineering difficulties, together with their extent, brought disaster to former contractors. Courage, as well as large capital and experience, was required to face the dangers of another venture. The Furst-Clark Construction Co. has, however, taken these works in hand, and with such success that both are to be completed in 1913. Both projects are of so much intrinsic interest, and promise collateral and direct benefits of such vast importance, that they merit detailed description.

THE CAPE COD CANAL.

Cape Cod, Massachusetts, is a curved promontory, in shape like a fish-hook, extending from the mainland at first eastwardly and then northwardly, enclosing Cape Cod Bay. That portion of Cape Cod Bay, adjacent to the eastern terminus of the canal, is called Barnstable Bay. Along the eastern and southern sides of the Cape Cod promontory are dangerous shoals, known as the Cape Cod and Nantucket Shoals, both of evil fame. One-fourth of all the wrecks occurring along the Atlantic Coast, from Eastport, Maine, to Key West, Florida, take place on the Cape Cod shoals. Between the years 1843 and 1893 as many as 2131 vessels were wrecked in the shoals region, and about 700 men lost their lives, to say nothing of property losses. Frequently sudden storms, with fogs, enhance the perils of this stretch of coast to the 50,000 vessels that yearly round the Cape. A canal across the isthmus, separating Barnstable Bay from Buzzard's Bay, would remove the risks of the outside passage, and at the same time lessen the distance between Boston and New York. The saving of distance by one route would be 66 miles; by another and much used route the saving would be as much as 142 miles.*

The idea of constructing a canal across the isthmus suggested itself to the Pilgrim Fathers as early as December, 1626, when the Sparrowhawk, from London for Jamestown, Va., was wrecked while rounding Cape Cod.

On June 21, 1909, Mr. August Belmont, president of the Boston, Cape Cod & New York Canal Co., accompanied by Governor Warfield and Mr. Frank A. Furst of Baltimore, and about fifty New York capitalists, inaugurated the work of excavation at Bournedale, on the line of the canal, by lifting a spadeful of earth with a silver spade.

The contract for the excavation of the canal prism and for rip-rapping the sides was awarded to the Degnon Cape Cod Canal Construction Co., of which Mr. Furst is treasurer and part owner. The Degnon company sublet the contract, which is worth \$3,500,000, to the Furst-Clark Construction Co. of

Baltimore, of which Mr. Furst is president, and Mr. Robert P. Clark of Galveston, vice-president. It is one of the largest construction contracts ever undertaken by one firm in this country. This fact was recognized by "The Contractor," a well-known engineering publication, which made comment upon the Baltimore firm's taking the contract away from Boston and New York bidders. "It is interesting," said "The Contractor," "to note that Southern interests have gone into the very camp of Northern contractors and landed a big job." This circumstance impressed also the "Philadelphia Record." "Baltimore brains, Baltimore capital and Baltimore contractors," the "Record" observed, "are to be used in digging the Cape Cod Canal from Buzzard's Bay to Barnstable Harbor." At the meeting of the Deeper Waterways Association in Norfolk in November, 1909, Mr. August Belmont, in an address favoring the Association's objects, expressed his appreciation of Mr. Furst's position. "If Mr. Frank Furst were not one of the best canal diggers in America he would not be digging the Cape Cod Canal. That work is progressing satisfactorily and we expect its completion three years from next spring." In saying this he was repeating words used the previous June when the work of excavation was formally inaugurated. "It is a great pleasure," he then said, "to have Mr. Furst of Baltimore associated with us in this enterprise. There is no question that he is one of the best-posted men on dredging in the entire country." "He is the superior of any other man in that line in the country," remarked ex-Governor Warfield of Maryland, who was standing by. "So much the better," Mr. Belmont replied. "With Mr. Furst's organization of the work I foresee success."

In the spring of 1909, when the Cape Cod proposition was undertaken, the Furst-Clark Construction Co. had but recently completed a contract worth \$500,000 for the transformation of Cape May. Some 6,000,000 cubic yards of material, dredged from the sea, were spread out over the swampy land adjacent to that summer resort, raising its level and increasing its salubrity. The Beaufort Inlet-Pamlico Sound Canal and the \$1,000,000 Erie Canal contract were in hand. A 35-foot channel was being excavated through York Spit, at the mouth of the Chesapeake; 1,500,000 cubic yards of earth were being removed from the Norfolk-Lambert's Point channel, and other dredging was being done near Crisfield, at two places in the harbor of Baltimore and in the Rappahannock River.

THE BEAUFORT INLET-NEUSE RIVER CANAL.

In enumerating some of the contracts Mr. Furst had in hand in 1909, mention was made of the canal connecting Pamlico Sound with Beaufort Inlet, a Government contract, begun October, 1908, and completed January, 1911. This canal merits special notice as being, with the Cape Cod Canal, an important link in the projected system of inland waterways, which, when completed, will extend from Boston to Key West. Of the seven or eight links needed to connect existing natural interior waterways, none is of greater importance than the inside route from Chesapeake Bay to Beaufort. It lies behind Cape Hatteras and Cape Lookout. It avoids also the terrors of the inner and outer Diamond Shoals, which jut out into the ocean for 25 miles from Hatteras, making that region the most dangerous for navigators on the Atlantic Coast. Off Cape Cod and Cape Hatteras are the two "graveyards of the Atlantic," both of which Mr. Furst will rob of their terrors.

A VAST DRAINAGE PROJECT.

On June 5, 1910, the Board of Drainage Commissioners of Florida awarded to the Furst-Clark Construction Co. a contract for the drainage of the Everglades, an area approximately 11,000 square miles. (Mr. Furst estimates the area affected at 7,000,000 acres). This is the largest piece of reclamation work ever undertaken. It means the reclamation of an area larger than the land area of Maryland (9941 square miles), Vermont (9135 square miles), Massachusetts (8040 square miles), or New Jersey (7525 square miles). It is much more than the combined land areas of Connecticut, Delaware, Rhode Island and the District of Columbia. It is equivalent to the addition of a new State to the Union. The enormously expensive reclamations carried out by the Federal Government in the Far West do not compare with it in extent or probable results. A large proportion of the acreage of the States named above is barren or infertile. Their agriculture is comparatively unproductive. But the acreage the Furst-Clark Construction Co. is reclaiming in the Everglades will be a rich, deep black soil of almost inexhaustible fertility. This work means, unquestionably, a large increase of the population and wealth of Florida, and from the national point of view a gratifying augmentation of the food supply of the Eastern and Middle States, to say nothing of the new stimulus given to manufacturing and transportation interests. Florida's population in 1910 was 752,619, or 42.4 per cent more than in 1900. The fruition of the present drainage scheme will doubtless be a growth of the percentage of increase, giving Florida in 1920 a population of over 1,250,000. It is difficult to exaggerate the expansion of population and production likely to follow upon this work.

The Everglades are submerged lands east, west and south of Lake Okechobee, embracing much of Southern Florida between latitude 25°10' north and 27°10' north, except an elevated rim of stone and soil which parallels the coast line and prevents the overflowing waters of the lake from obtaining easy exit to the Atlantic on one side and the Gulf on the other. Drainage canals to be efficient must carry off 24 inches of rainfall from a watershed of 4,000,000 acres in two consecutive months. There are nearly 30,000 lakes in Florida, mostly sink holes formed by the solution of the underlying limestone.

*By the Vineyard Bay route (336 miles long) 66 miles; by the outside route (402 miles) 142 miles.

These lakes are often connected by subterranean channels, and through such channels part of the waters of Okeechobee is thought to reach the sea. Lake Okeechobee is the storage reservoir of the Everglade region, and in that capacity will prove most useful for purposes of irrigation after its waters are brought under control. It is fed by various springs and creeks, but chiefly by Kissimmee River, which has its source in Lake Kissimmee, Lake Istokpoga and lakelets further north.

THE FURST-CLARK CONSTRUCTION CO. TAKE THE JOB.

In May, 1910, the Drainage Commissioners of the State, with a view to expediting this reclamation work, decided to hand it over to a contractor whose ample equipment, energy and skill would ensure its completion in three years. Accordingly, June 5, 1910, the contract was awarded to the Furst-Clark Construction Co.

The contract includes five canals of an aggregate length, including branches, of 238 miles, and involves the excavation of 18,000,000 cubic yards of earth at 8.4 cents per yard, and 6,000,000 cubic yards of rock at 20.2 cents per yard.

Some of the canals are connected with others by branches so as to enclose certain areas, with a view to their more effectual drainage. Since a certain level must be maintained in Lake Okeechobee, a lock or gate will be required at the mouth of each canal where it reaches the lake to regulate the outflow, and other locks will be needed in the canals to maintain in the Everglades, during the dry season, water enough to irrigate farms. For Okeechobee is to be regarded in the future as a valuable reservoir.

Work was begun by the Furst-Clark Construction Co. July 1, 1910, and at the end of September, 1911, over 33 per cent. of the contract, exclusive of the Gulf Coast Canal, had been excavated. Fifty miles of new canal had been excavated and 8.36 miles of old canal had been deepened. (The State had dug about 31 miles before it gave up the job). This meant 5,694,321 cubic yards of earth and rock removed. In July, while getting through the "rim," 32,025 cubic yards of rock were excavated; in August, 6075 cubic yards; in September, 11,836 cubic yards. Nine dredges and one drill boat are at work, and progress is so rapid that the completion of the contract by July, 1913, is confidently expected.

Soon after work began dredges, ascending the Caloosahatchee River, entered Lake Okeechobee, and crossing it broke through its shores and began dredging eastward and southward. Other dredges working inland from Deerfield, Fort Lauderdale and Miami were hastening to meet them, and some of the dredges from the Lake have already met some of those from the coast. The latter have to build dams behind them to float in while prosecuting their work. Those descending from the lake do not need to do this. For this reason it has been thought desirable to work as many dredges as possible from Lake Okeechobee outward toward the coast.

A SAND AND GRAVEL MINE.

The Arundel Sand & Gravel Co., of which Mr. Furst is president, has developed a large and profitable trade in a by-product of the dredging business. It is found that the sand and gravel taken from the Patapsco River near Baltimore and from adjacent streams makes the best concrete. It has qualities that specially fit it for this use. It is consequently in great demand. Some 1200 loads are sold daily in Baltimore, and Florida takes yearly half a million cubic yards. In the construction of Mr. H. M. Flagler's Florida East Coast "Over Sea" Railway, immense quantities of good sand and gravel are required for concrete abutments and bridges. At Cedar Point, near the mouth of the Patuxent River, the company has 700 acres of gravel deposits, reputed the best in the United States.

CONCRETE SHIPBUILDING.

One thing follows another. As the sand and gravel business grew out of the dredging business, so out of the sand and gravel business a shipbuilding industry is being evolved. Mr. Furst's latest enterprise is the organization of a company to construct barges and perhaps other vessels of concrete. His engineering operations have familiarized him with the capabilities of concrete, both alone and when reinforced with steel, and his Arundel Sand & Gravel Co. will supply him with a large part of his raw material at the lowest price. The barge-building business is accordingly a natural outgrowth of his present business. A barge with a capacity of 86 tons was built at Baltimore to test the ability of a concrete structure to meet the stresses to which vessels of this character are subjected. It has been found satisfactory. Heavy weights have been dropped into it from a considerable height. A load of 92 tons has been placed on it. It has been bumped severely against wharves. All without injury. So satisfactory has the barge proved to be that 7½ acres of land near the Marine Hospital, Baltimore, have been purchased for the construction of a suitable building plant.

Special appliances will be required. A broad flat-bottomed boat like a barge or scow could not be launched as an ordinary ship is launched. A ship, poised on a narrow keel—which bears its entire weight—slides down the greased ways when certain props are knocked out, and takes the water gracefully, as the conventional phrase goes, "like a duck." Not so the ungainly scow. The concrete-bearing scow, or barge, is a different proposition. It will need to be built on a many-wheeled car resting on a broad inclined railway. The car bearing the barge will at the proper time run down the railway into the water and the barge will float off when the proper depth is reached. By this device the flat bottom will not be subjected to excessive strain along a narrow line, but the strain will be distributed equally over the entire bottom, as will be the case when the barge is in the water.

Barges are of various kinds. The word barge formerly designated a small sailing vessel, but at present it means commonly a strong flat-bottomed boat, without masts and sails, used to carry heavy freight in inland and coastwise

navigation. It is often of large capacity, much exceeding 100 tons, and is usually towed by a tug, but is sometimes fitted with a motor. Barges used for unloading and loading ships in harbor are frequently called lighters. The scow used to convey the earth raised by a dredge in deepening a harbor or ship channel is a sort of a barge—a "poor relation."

The idea of making of concrete a sea-going vessel subject to hard knocks seems at first somewhat ridiculous. Going to sea in crockery or glassware would seem hardly more absurd. And absurd it would be, perhaps, to face the stormy deep in a concrete vessel if the properties of concrete could not be vastly improved—as they are—for structural purposes by reinforcing it with steel. Steel gives concrete a new character. There are two kinds of strain or stress to which a structure is subject—compression and tension. Concrete bears compression admirably, but used alone it is of little or no value for resisting bending or tensile strains. Under a load concrete will carry a given weight at six-tenths of the cost of the steel required to bear the same load, but if employed to withstand a given tensile strain it would be six times as expensive as the amount of steel that would serve the same purpose. It is accordingly desirable to combine tensile strength with the quality of withstanding compression by imbedding steel rods in the concrete used to make a beam, column, pile or floor.

It is of reinforced concrete that Mr. Furst will construct his barges, pouring the moist mixture of cement, sand and gravel about a steel skeleton, not plastering the skeleton with it, as did the Italians some years ago in an abortive effort to bring concrete ships into use. Each material, the concrete and the steel, in Mr. Furst's method of construction, will serve the purpose for which it is cheapest. An incidental benefit from imbedding the steel in the concrete is that it is protected perfectly from corrosion, and very largely from the effect of fire.

It follows that barges built on Mr. Furst's plan will take hard knocks from each other or collide with wharves and rock without material injury. They will easily withstand the shock of heavy seas, and being cheaper to build than ordinary barges of wood or steel, they may be expected to come into wide use. They will not rot like wood, nor rust like steel. They will therefore be more durable than wooden and steel barges. Add the fact that unskilled labor can be used largely for concrete structures, and it will appear that the reinforced concrete barge should possess the attraction of cheapness. The demand for cheaply built, yet safe and efficient barges and scows, can hardly fail to be very great. Every port in the United States, every canal, every river, every dredging company, employs these vessels.

In addition to these vast operations, Mr. Furst is occupied with the United Railways & Electric Co. of Baltimore, of which he is vice-president. He is a member of the Executive Committee of the Democratic State Central Committee of Maryland. He is president of seven companies and director in sixteen boards. Though interested in politics and delegate to two Democratic National conventions and innumerable city and State conventions, he has never been a candidate for public office, and has never held a public salaried position. He has, however, served the public often as member of various unpaid city and State boards. In 1908 he was appointed by Governor Crothers to the Police Board of Baltimore, but declined, thinking that another man with more leisure could easily be found. In the line of social service he is a director of St. Mary's Industrial School. He has been a member of the Corn and Flour Exchange since 1872 and president of the Maryland Penitentiary Board, honorary for past eight years. Mr. Furst is interested in everything and shirks no civic duty.

FRANK A. FURST, THE MAN.

He was born December 30, 1845, in Baden, Germany, and was brought by his father to Baltimore when two years old. His first year he lived at the old mansion on Fell's Point, erected by William Fell, who gave name to the locality. His home subsequently was at 4 North Broadway. He attended St. Michael's Parochial School, giving odd hours to stripping tobacco at \$2 a week. When sixteen he volunteered for service in the Federal Army and was with the topographical engineers of General McDowell's corps. He saw active service at Bull Run. After the war he went West. Having left St. Louis with a supply train for Fort Benton, Montana, his party was attacked by Indians and 16 were killed. He was shot through the leg and was taken back to St. Louis, whence he returned to Baltimore, being then 21 years old. He was in the Northern Central grain elevator service for 30 years, leaving it in 1901 to give more attention to the dredging business which he began in 1883. In that year he organized the Baltimore Dredging Co., which in 1898 was reorganized as the Maryland Dredging & Contracting Co. with various collateral branches.

Notwithstanding Mr. Furst's many engagements, he is not in the ordinary sense of the word a hustler. He is never hurried. His manner is not that of a man overburdened with cares or worries. He is not stern, hard, abrupt, dictatorial and unapproachable as an inferior man having one-tenth of his work is apt to be. On the contrary, he is an amiable man, whose bearing prepossesses one in his favor. Robust of figure, large, strong, of pleasant address, smiling, cheerful, affable, he is the personification of courtesy and good humor. A wonderful thing about him, in fact, is his capacity for mastering with evident ease and quickly the thousand details and implications of large enterprises, and for shouldering vast business responsibilities with imperturbable equanimity.

"I have lots of time, don't hurry," was his reply to a caller who apologized for detaining a busy man. "My work is so systematized that I have abundant leisure." With so many irons in the fire he yet feels no need of a vacation. His business is his pleasure and diversion. "The most agreeable vacation is one you enjoy? Well, I find recreation, change and variety in my work. My business, which requires much travel, keeps me active physically and mentally. I should not be happy without plenty to do. I'll remain young so long as I've work."

American Cities Company

Scope of Operations of Corporation Owning Important Southern Utilities

THE constituent companies of the American Cities Co., Jersey City, N. J., and New Orleans, La., are:

- New Orleans Railway & Light Co., New Orleans, La.
- Birmingham Railway, Light & Power Co., Birmingham, Ala.
- The Memphis Street Railway Co., Memphis, Tenn.
- Little Rock Railway & Electric Co., Little Rock, Ark.
- Knoxville Railway & Light Co., Knoxville, Tenn.
- Houston Lighting & Power Co., 1905, Houston, Tex.

The officers of the company are:

J. J. Gannon, chairman of the board.
 George H. Davis, president.
 George Bullock, vice-president.
 William von Phul, vice-president.
 R. E. Slade, treasurer and assistant secretary.
 M. McGrath, secretary.
 Ira Lockwood, assistant treasurer and assistant secretary.

DIRECTORS:

A. J. Hemphill,	Frank B. Hayne,	S. R. Bertron,
Charles Janvier,	E. H. Bright,	George Bullock,
Fernand Lapeyre,	Harry Bronner,	Wm. P. Bonbright,
Emil Loeb,	George H. Davis,	Maurice Stern,
S. Z. Mitchell,	Lynn H. Dinkins,	L. K. Thompson,
J. K. Newman,	Marshall J. Dodge,	William von Phul,
J. J. Gannon,	G. L. Edwards,	R. M. Walmsley,
R. M. Gannon,	C. P. Ellis,	A. H. Wiggin,
Charles Godchaux,	C. E. Allgeyer,	F. B. Williams,
Oscar L. Gubelman,	Geo. W. Bacon,	

A condensed balance sheet as of December 31, 1911, shows:

ASSETS.

Securities Owned.....	\$45,659,287 02
Cash	679,980 82
Bills Receivable.....	786,000 00
Accounts Receivable.....	257 62
Advances for Expenses.....	195 44
Deposits for Interest and Dividends.....	865,426 00
Total.....	\$47,991,146 90

LIABILITIES.

Preferred Capital Stock.....	\$20,514,200 00
Common Capital Stock.....	16,250,600 00
Eight-year 5-6% Collateral Trust Gold Bonds.....	10,000,000 00
Amounts Due Other Companies.....	318,687 70
Interest and Dividends Due Covered by Special Deposits.....	865,426 00
Profit and Loss (Surplus).....	42,233 20
Total.....	\$47,991,146 90

Following are the constituent companies of the American Cities Co.:

NEW ORLEANS RAILWAY & LIGHT CO., NEW ORLEANS, LA.

Owens and operates the entire street railway and gas business, and, with the exception of one competing company, the electric light and power business in New Orleans, La. The territory served has an estimated population of about 350,000.

New Orleans is the largest city in the South, and is exceeded only by New York and Philadelphia in tonnage of vessels cleared in foreign trade. Its location makes it naturally the southern gateway to the Mississippi Valley and its principal outlet. There are at least nine railroads, with 50,000 miles of track, having terminals there, which a public belt railroad places on the same basis of entrance to the city. The Southwest Pass to the Gulf, which has at present a minimum depth of 30 feet, and upon completion 35 feet, affords greater facilities in reaching New Orleans to 35 lines of steamships engaged in coast and transatlantic commerce. There are almost unlimited deep-water docking facilities, consisting of miles of wharves equipped with modern storage sheds and freight-handling apparatus.

The largest sugar refinery in the world and immense grain elevators are located there. It is one of the largest markets for cotton, sugar, coffee, rice and bananas in the United States, and its lumber market is the largest in the South.

BIRMINGHAM RAILWAY, LIGHT & POWER CO., BIRMINGHAM, ALA.

Owens and operates the entire street railway, gas, electric light and power and steam heat business of all the municipalities recently incorporated into the city of Birmingham except the municipal lighting in North Birmingham, and serves the adjoining municipalities of Brighton, Bessemer, Jonesboro and Boyles. The population of the territory served is estimated to be 150,000.

The natural resources of the Birmingham district are phenomenal. Nowhere else in the world are coal, iron ore and limestone, the three essential elements which enter into the production of iron, found in such close proximity or in such extensive quantities, or can pig-iron be manufactured so cheaply.

THE MEMPHIS STREET RAILWAY CO., MEMPHIS, TENN.

Owens and operates the entire street railway business in the city of Memphis and adjacent territory. The territory served has a population of about 150,000.

Memphis is the largest city in Tennessee. It is an important railroad center, having 11 trunk lines radiating in all directions. It is the largest inland primary cotton market in the country, and is also an important market for cottonseed products and the largest hardwood lumber market in the world.

LITTLE ROCK RAILWAY & ELECTRIC CO., LITTLE ROCK, ARK.

Owens and operates the entire street railway and electric light and power business in Little Rock, and electric lighting in a portion of Argenta and Pulaski Heights. The territory served has a population of about 65,000.

Little Rock is the capital of Arkansas and the county-seat of Pulaski county, as well as the largest city and the commercial, financial and railroad center of the State. It is one of the largest interior cotton markets in the United States and one of the most important jobbing centers of the Southwest.

KNOXVILLE RAILWAY & LIGHT CO., KNOXVILLE, TENN.

Owens and operates all the street railway and electric light and power business in Knoxville, and serves in addition the outlying incorporated cities of Park City, Lonsdale and Mountain View, and the suburbs known as Fountain City, Oakwood, Lincoln Park and South Knoxville. The population of this territory is about 75,000.

Knoxville is the commercial and banking center of a large part of the South Appalachian region, the natural resources of which in hardwood, marble, coal and iron are now being rapidly developed. It is also an important manufacturing and jobbing center. In addition to the excellent railroad facilities, it is situated on the Tennessee River, which is navigable during a considerable portion of the year to a point above Knoxville.

HOUSTON LIGHTING & POWER CO., 1905, HOUSTON, TEX.

Owens and operates the entire electric light and power business in Houston. Houston is one of the largest cities of Texas, having a population, including suburbs and nearby points served, of nearly 100,000. It is the county-seat of Harris county and is the greatest railroad center of the State, having 15 lines of railroad, with the finest terminals south of St. Louis.

Houston's ship channel, now undergoing improvement by the United States Government, will give direct connection with the sea. Houston is the center of the oil-producing district of Texas, and it does the greatest jobbing and manufacturing business of any city in Texas, being also a very important lumber and cotton market.

The cities in which this company operates are among the most strategic as to location in the entire country.

They are financial and commercial centers of sections unsurpassed in resources and present development by any in the South, and what they have done during the last ten years in the increase of trade and industry and population, as shown elsewhere in this publication, will be far surpassed during the next 10 years.

Their combined population at present is 890,000. Every advance made by any part of the South will inure to their benefit and their combined growth.

Facts and figures presented in this issue of the Manufacturers Record show that the material advancement of the South has been one of the marvels of American civilization. However, the South's advance during the last 30 years, marvelous as it has been, is only indicative of what the future will show. The real development of the South has just begun. The things accomplished give a hint of the things to be achieved.

The views of many of the leading experts in America, some of the foremost leaders in finance and industry in this country, as to the future of the South, published in this issue, are optimistic in the extreme. Their statements show that the business world is now looking toward the South as the coming center of industrial, agricultural and financial activity in the United States.

Glamorgan Pipe and Foundry Company

Lynchburg, Va.

Its Growth From 1887 With Two Small Buildings to a Plant with an Annual Capacity of 30,000 Tons of Pipe and 6,000 Tons of Special Foundry Work.



PROBABLY no industrial plant in the entire South illustrates more clearly in its own history the opportunities for success presented by that section to those who have the foresight to recognize and the courage to utilize them than the Glamorgan Pipe & Foundry Co. of Lynchburg, Virginia. This company was organized in March, 1887, and in two small buildings, and in a small way, began the foundry and machine business, devoted to repair and jobbing work. Just about the same time the South began to awake to its own advantages as an industrial and manufacturing section, and to show signs of the life and spirit that have since brought such a marvelous degree of prosperity. Finding the repair and jobbing business unprofitable the company determined to venture into the manufacture of cast-iron pipe, and in the fall of 1887 began to make pipe on a very small scale. The business gradually grew and it became necessary for the company to enlarge its quarters, which it did by erecting additional buildings, all frame, to an extent that more than doubled its original working room. In 1894 the entire plant was destroyed by fire. It was immediately rebuilt on modern lines and equipped with modern machinery. Increases have been made from time to time until now instead of the small buildings in which it began work the company has more than a score of buildings, many single ones among which are as large as both of the original put together, and its output has grown until its present annual capacity is 30,000 tons of pipe and 6000 tons of special foundry work.

This growth is due not to any one cause, but to a combination of causes. To bring success to a manufacturing plant even the greatest advantage of location and the keenest of foresight to recognize it must be backed by ability and management, mastery of detail, energy and enterprise in execution.

The advantages of location peculiar to Lynchburg are (1) that which comes from economy in assembling raw materials of a high grade; (2) geographical situation with regard to markets; (3) facilities for and cheapness of distribution.

In the matter of raw materials the position of Lynchburg could hardly be better. Direct lines of railroad connect it with a number of Virginia iron furnaces, the quality of whose products is not excelled for foundry purposes by any iron in the country. This iron is possessed of great tensile strength and a high degree of purity, and possesses also to a high degree the power to resist corrosion, rendering it specially adaptable for making pipe that is to be laid under ground. The coke used in melting the iron for casting comes from the famous coal fields of West Virginia, which lie but a few miles away, and with which there is direct connection by two lines of railway. Thus are the two raw materials most used in foundry work, coke and pig iron, easily and cheaply brought together.

Lynchburg's geographical position with regard to the best market—that of the rapidly growing agricultural region of the South—is unrivalled. It stands on the most direct line between Northern manufacturing points and these Southern fields of consumption for the trade of which it seeks. Three trunk line railroads pass through Lynchburg, not only furnishing unsurpassed facilities for distribution, but giving also the advantage of lowest possible freight rates. Therefore the product of the Glamorgan Pipe & Foundry Co. is able to reach a large region to the south without meeting any very considerable competition until it gets into the trade radius of Birmingham, which is narrowed by the difference in freight rates in favor of southbound as against northbound traffic. The extensive municipal improvements being carried on in Southern towns, in the inauguration and extension of water-works and gas lines, have brought to this company a very large trade in the past 20 years.

The Glamorgan Company has been peculiarly fortunate in its management, which has so systematized its operations and introduced so many economies that the plant is kept working at its highest stage of productivity with the smoothness and lack of friction of a well constructed machine, and the managers know at all times exactly what progress is being made in each particular department and that it is being done at the lowest cost consistent with good execution. Energy and enterprise are shown in the manner in which every department is kept going at full speed and by the fact that the class of articles manufactured is kept abreast of the demands of the trade.

The same energy and enterprise displayed in the management of the producing department are shown also in the conduct of the selling department, which has carried its aggressive campaigns for business over a wide expanse of territory. This is shown by the fact that each year brings to the company patronage from new fields, as well as an ever-increasing amount from the old. There is, in fact, no general section of the United States between the two oceans which gird the continent into which the Glamorgan Company has not sent its seekers for trade; none among whose people it cannot count some patrons.

One element that undoubtedly enters into the success of this company is the efficiency of the labor employed. The skilled mechanics and the trained laborers are practically all native born white men. They are intelligent, faithful and reliable, and in addition are imbued with ambition to have their individual work properly done, and pride in the combined accomplishment of the whole force. They are men for the most part of some education, and the visitor is struck with the friendly personal relations existing between the men

who do the work and those who direct it from the office. An atmosphere of kindly appreciation pervades the entire plant that cannot but show in the quantity and quality of the product. The contrast between this class of laborers and the foreigners that fill the shops and mills of the North is no less striking than the contrast between the same men and the negroes that constitute the principal laboring force in those farther south. While the scale of wages paid here is something lower than in Northern cities, the money means fully as much to the men who earn it, because of the lower cost of living in this locality. Labor troubles such as vex manufacturers elsewhere and disturb trade conditions are unknown in the Glamorgan plant, largely owing to the feeling of mutual esteem that animates employers and employees. These tranquil conditions have much to do with economy of production as well as with excellence of product.

The plant is fitted up with the latest and most modern machinery and appliances for the speedy handling of its business at the lowest cost consistent with good work—flange lathes, drills, planers, steam hammers, and all the other labor-saving devices and appliances that go to make up the equipment of first-class foundries, forges and machine shops. These machines are driven by water power, steam power, and electric power generated by steam. The water power comes from the James River, a part of whose current, led by a great race through the grounds of the company, is thus converted to its uses.

On the yards is apparent the same excellent management that is seen inside, and numerous economies have been adopted for the saving of labor. Railroad sidings lie on either side the yards for convenience in loading, and a powerful steam crane, mounted on car trucks, takes the heavy pipe from the small cars as they come from the moulding rooms and lays it in piles, to be picked up again and loaded on railway cars when the time for shipping comes.

Among the numerous products of this concern are flange pipe and fittings of all kinds; gate hydrants, "underwriter" hydrants, and the famous "Glamorgan" hydrants, for which it holds the patent, and of which it makes a specialty. This hydrant embodies a number of improvements over those commonly in use, one of the principal of which being that it bolts at the street level and can be readily removed without digging down to the main. It is being extensively used over a wide scope of territory, and is immensely popular wherever it has been tried. The "Glamorgan" valve is another patented device embodying a number of improvements, of which it makes a specialty, and which has achieved wide popularity among the customers of the plant. In addition to these things the plant is thoroughly equipped for general foundry work and machine work. The excellence of the work done by this company is attested by a gold medal presented at the Jamestown Exposition—the highest award made by the experts appointed to pass upon the merits of the many displays made at that great celebration.

The board of directors of the Glamorgan Pipe & Foundry Co. is composed of a number of the most progressive business men of Lynchburg, as well as some who have become leaders in the commercial and industrial life of other localities. They are young men, full of enterprise, and inspired by faith in the future of the country and especially of the South, whence they draw so much of their business. The directory is as follows:

Walker Pettyjohn, vice-president of the People's National Bank, president; A. M. Campbell, vice-president and general manager; H. L. Campbell, secretary and treasurer; P. B. Winfree, assistant manager; John W. Craddock, president Craddock-Terry Shoe Co.; O. B. Barker, president Barker-Jennings Hardware Co.; G. E. Vaughan, cashier People's National Bank; N. D. Eller, treasurer Piedmont Mills; James I. Pritchett, Danville, Va., president Piedmont Mills; A. J. McClure, New York; J. T. Noell, Jr., capitalist, Lynchburg, Va.

The active management of the company's affairs is in the hands of General Manager A. M. Campbell, Assistant Manager P. B. Winfree and Secretary and Treasurer H. L. Campbell, three young men who are thoroughly acquainted with the business in its every detail. They are active and energetic, full of the spirit of progress that animates the New South, strong in the faith that it is the section to which the immediate future will bring its greatest development, and fully inspired with the belief that if they strive to meet the demands of the trade by furnishing well-made goods at moderate prices, they will not only be able to hold their present big list of customers, but that they will be able to enlarge and increase it as the population of their trade territory increases and the demand for products in their line is enlarged. They know—nobody better knows—that the success of the Glamorgan company did not merely happen; that the tremendous growth it has enjoyed did not come to it by chance; that it was the result of constant and intelligently applied effort. They know that to secure to their company the full effect of its advantages of position, of railroad facilities, of freight rates and of labor conditions the management must be aggressively progressive, must keep abreast of the times, study to meet constantly arising new conditions, must be alert to understand and adopt modern methods of manufacture, sale and distribution. Thus prepared, and thus determined, it will be strange indeed if they do not cause the enterprise under their management and control to show in the next few years an increase in business, a growth in power and importance, even more wonderful than that which it has achieved in the past.

Lynchburg, Virginia

500 Per Cent. Increase in Ten Years

THAT in figures is the record of the manufacturing business in Lynchburg during the past decade, during which period the city has grown by leaps and bounds—in population, wealth, manufacturing and wholesaling. In building operations and in the general improvements of a civic nature the results accomplished have been wonderful; there has been a complete revolution of business, and Lynchburg has become one of the most progressive of the smaller cities in the United States, likewise one of the most beautiful and satisfactory places of residence in the country.

The history of Lynchburg for the last decade is a story of inspiration for the entire South.

The American people are so accustomed to the rapid growth of cities in new and undeveloped sections that it would take a veritable picture from the adventures of Aladdin to attract their attention to such for more than the passing moment; but for a town of more than a century's age, standing a bare two hundred miles from the spot where Anglo-Saxon civilization first struck root in the soil of the Western Hemisphere, to rise to sudden life and between census periods add more than 56 per cent. to its population, 500 per cent. to its manufactured product and increase its jobbing trade in dry goods, notions and shoes to first place among Southern cities, this is, indeed, a record to command attention even in this wonderland of achievement. Such is the record of which Lynchburg boasts; such the results in which the men who accomplished it take such just pride.

Lynchburg situated on the James River is one of the historic towns of the Old Dominion. Lots were sold there before the dawn of the nineteenth century, and in 1808 it became an incorporated town. It had a steady, though not rapid growth for a number of years, and had achieved distinction as a tobacco market and manufacturing point before the Civil War. Many of its citizens amassed considerable fortunes and built splendid residences, and the city was known far and wide for the education and refinement of its people and the generous hospitality of its homes. But it did not, in later years, grow as the more progressive element of its citizenship thought it should, and they began to make a study of conditions with a view to starting it on the highway of progress.

Looking to the south they saw a large section, unmatched in fertility of soil and in other resources that fit it for the abiding place of a large and prosperous population—a section long held in leash by the force of untoward circumstances, but now going forward with giant strides to the place of primacy nature in her most bountiful mood fitted it to hold. They realized that the twenty-five millions of people in that territory must in the nature of things be for many years purchasers rather than producers of manufactures. They recognized the economic principle that the community most favorably located with respect to freight rates and distributing facilities would by proper effort become the jobbing center for that territory; that the same point, with the added advantage of economy in assembling raw materials, and the further advantage of cheap power, could furnish that vast section with a large proportion of the manufactures it would be forced to buy.

In the light of these things they took stock of the advantages possessed by their own city. They saw that Lynchburg was the gateway to the South, through which the products of the manufacturing and jobbing centers of the North must pass on their most direct route to Southern markets, and that railroads radiating from Lynchburg made it the natural distributing point for those markets. They realized that the raw materials for certain kinds of manufactures—iron, lumber, cotton, tobacco and numerous others of greater or less importance—could be brought to meet the coal from Virginia and West Virginia mines very cheaply in Lynchburg; while the great volume of water pouring down from the higher to the lower reaches of the James River, already utilized to some extent in the generation of power, could be made to do many times its present work by a proper system of developing hydro-electric energy to drive the wheels of important enterprises.

Then came the conviction that Lynchburg combined more of the elements necessary to city building than any other point in the same general section, and that, with intelligent, well-directed effort, it could be made the manufacturing and jobbing center for the territory under contemplation.

Having worked out these conclusions these gentlemen set to work to take advantage of their close-lying opportunities and to make the possibilities of their city known to the outside world. In these undertakings they were successful, and the result has been that men who have long resided there have put their surplus means in new enterprises; while a campaign of publicity has been carried on that has brought in many new men and much new money to join in the work of making Lynchburg one of the important commercial and industrial cities of the country.

From 18,891 people shown by the census of 1900, the city grew to 29,494, as shown by the census of 1910; its activities increased until there is now invested in manufacturing and jobbing establishments about \$21,000,000, and the volume of business reaches \$45,000,000 annually, or more than \$1500 for each man, woman and child shown by the census to be resident in the city.

While it is impossible in a sketch of this character to treat at length of each individual line of industry, a word must be said of the manufacture of shoes, not only because of the phenomenal growth it has enjoyed, but because it typifies what intelligently directed effort has done and can do in Lynchburg. In 1878 the jobbing of shoes was begun in Lynchburg. In ten years the volume had reached \$2,500,000. In 1901 the first shoe factory began work, and now Lynchburg has five such factories, with an annual combined output of about

\$5,000,000, and its total sale of shoes is in the neighborhood of \$9,000,000. There was no special reason why Lynchburg should be chosen as a location for shoe factories that would not govern in choosing locations for various other industrial plants. The same success that has come to the manufacture of shoes waits to crown the exercise of similar enterprise in numerous other lines.

Lynchburg is the second largest market for cast-iron pipe in the Southern States, being exceeded only by Birmingham.

As a wholesale market for dry goods and notions it enjoys an annual volume of business greater than some of the largest Southern cities, and for years has advertised itself as the leading dry goods and notion market in the South.

Lynchburg also distributes more vehicles—wagons and buggies—than any other Southern city, and embraces in this branch of manufacture one of the largest wagon factories in the country. But while the products of these plants total a large amount yearly, it is not in the possession of a few big establishments that Lynchburg's strength lies, but rather in the number and diversity, of which the following list comprises some of the most important:

Shoes (men's, women's and children's), hosiery, cotton goods, shirts, overalls, mattresses, cast-iron pipe, plows, cigarette machines, cigarettes, tools and foundry products, buggies and wagons, blank books and stationery, wooden and paper boxes, extracts for tanning and dyeing, flour, meal and mill-feed, fine confections, tobacco (plug and smoking), barytes, sash, doors, blinds and mill work, brick, brooms, drugs, gloves, harness, ice, hats.

So much for what Lynchburg has accomplished and is accomplishing in the industrial line. It is but an index of what can be accomplished in the same place, and in ever growing volume, for the city's trade zone is increasing in population and purchasing power with each passing year. What Lynchburg has to offer business men and manufacturers is more to the point. Its offerings consist of three trunk lines of railroads, radiating in every practical direction, giving freight rates to the great consuming section to the south that cannot be met by points farther north and west, and enabling Lynchburg to compete anywhere, besides furnishing unsurpassed facilities for distribution; an abundance of hydro-electric power at a minimum of cost; economy in assembling various kinds of raw materials and of securing the best of coal and coke; and, of equal importance with the most important of the things already mentioned, a sufficiency of high-class labor—apt, industrious, reliable. Great economy to the manufacturer lies in the fact that the factory operatives in Lynchburg are for the most part native born whites, ambitious, of high intelligence and attached to their homes. Many of the Lynchburg operatives own their homes, so that they are of more stable character than those who have no such attachments. The intelligence and dependability of its working class have had much to do with bringing Lynchburg to the front.

As a place of residence, Lynchburg presents attractions that are rarely equaled and never surpassed. The rolling character of the country in which it is situated makes for ideal residence sites, and many of these have been utilized as locations for homes of great beauty and elegance, some of them with extensive lawns and grounds, whose natural loveliness has been much enhanced by care and cultivation. The view from some portions of the home section is as beautiful and inspiring as can be found anywhere—the varying tints of foliage of hill and valley, the dark blue of the mountains rising height upon height to the towering "Peaks of Otter" that loom in the distance, 4000 feet above sea level—these things combine to form a scene of surpassing beauty and splendor.

In point of educational advantages, Lynchburg has much to offer. Its excellent public school system is augmented by Randolph-Macon Woman's College within the city limits, and the Virginia Christian College and by the University of Virginia and other of the State's most famous schools close at hand.

In the matter of churches, those institutions that add so greatly to the attraction of cities when men are looking for homes in which to rear families, Lynchburg is abreast with the best in the land, and possibly no city in the country of twice its population can boast of so many costly houses of worship. All denominations are represented, and they have a combined membership of over 15,000, with church property valued at well over a million dollars.

The men who have done so much for the upbuilding of Lynchburg on its commercial side have not overlooked or neglected their civic obligations, and the leading members of its business organizations also exert wide influence in municipal politics. The consequence is a city government that looks carefully after the welfare of the citizens, strict in the enforcement of the law.

The water supply is brought from Pedlar River, twenty-seven miles away, and the city's mains are filled with an ample flow taken from the mountain stream, whence it comes by gravity's unaided force. Chemical and bacteriological analyses have found it absolutely pure, rendering filtration and chemical application unnecessary. The city's extremely low death rate is further proof of the water's purity and healthfulness.

What more has any city to offer? What more could any city have than low freight rates, ample facilities for distribution, cheap power, raw material economically accessible, a well-trained and intelligent factory element, attractive residence qualities, pure air, good water, and a social life that combines education and refinement with hospitality in its truest and best sense?

These things, together with the newly awakened enterprise of its business men, wrought miracles for Lynchburg during the last decade, and are working other miracles in the decade now current.

Texas as an Iron-Producing State

The Industry Now Commercially Established

THERE has begun in East Texas the development of a vast iron ore field, strictly along commercial lines, which contains possibilities of tremendous advantage to the entire Southwest. During March the East Texas Brown Ore Development Co. will begin the shipment of iron ore from the company's mines in Cass, Marion and Upshur counties on contracts with New York ore buyers covering a minimum of 250,000 tons, to be delivered at Philadelphia at regular intervals up to the end of 1913. One hundred thousand tons will be shipped during 1912, and at least 150,000 tons in 1913. It is also quite possible that some of the ore will go to Europe, this depending on ocean freight rates. It might go as ballast in cotton ships. This would not be to the deprivation of any local business, but in addition to it.

This establishes the iron ore industry of Texas as a commercial proposition and is of itself an interesting and important industrial development for the Lone Star State if it were without other significance.

However, in addition to mining and selling iron ore as a profitable enterprise, the plans of the company contemplate the ultimate establishment in Texas of an iron and steel-making industry, very probably at Port Bolivar, on Galveston Bay, thus creating an entirely new line of activity for the section and opening up a field for industrial enterprise susceptible of almost indefinite expansion, with immeasurable benefits to all that region. If Texas could produce the steel rails, water and sewerage pipes, bar iron and cotton ties she uses, she would retain the money they cost and have the products too, whereas, as Lincoln expressed it, by buying elsewhere, she gets the goods, but the other section gets the money. Thus many millions of dollars would be added to the financial resources of Texas by such a development.

A by-product coke plant and blast furnace, and then a rolling mill and tube works would probably be the order of development, and when these were established other forms of iron and steel-making would follow in sequence, and as a consequence, until a broad general development would be the result.

These features, however, will follow slowly, naturally, and in accordance with the substantial, thorough and orderly manner in which the developments by the company have heretofore been made. For the immediate present activities will be confined to the mining and shipment of ore for use in Northern furnaces. This has been made possible by the construction of 30 miles of new railroad, from Longview into the ore fields, and the establishment of ore docks at Port Bolivar, to which point the ore is shipped via the Port Bolivar Iron Ore Railroad from the mines to Longview, the Gulf, Colorado and Santa Fe, from Longview to Beaumont, and the Gulf & Interstate Railroad from Beaumont to Port Bolivar. From Port Bolivar the ore is shipped North in steam vessels.

Every feature of the development has been made in the light of the most careful, thorough and widespread investigation, and the improvements embody the latest and best ideas in their line. Three years were spent in making test pit examinations of the ore field in East Texas. Many analyses were made and there was a further test of the ores by large blast furnace runs. Over 25,000 acres of approved ore lands in Cass, Marion and Upshur counties were bought outright. They contain over 100,000,000 tons—possibly 150,000,000—of first-class smelting ore; a soft brown hematite, of lumpy formation, running as high as 60 per cent. and averaging over 50 of metallic iron. It is

stated that deliveries at Philadelphia will be at 52 per cent. and better metallic iron, 12 per cent. silica, .09 phosphorus, and sulphur none.

A recent article by Dr. William B. Phillips, director Bureau of Economic Geology and Technology, University of Texas, Austin, quotes from a Texas report of 1890 date, from which he concludes that the East Texas ores rank with the best brown ores in the country; are easily and cheaply worked and may be economically smelted. Exploitation of the field by recognized authorities in recent years demonstrates even a more favorable condition than indicated in the Kennedy report referred to by Dr. Phillips, and the claim is made that this is the largest and richest body of brown hematite ore to be found anywhere. In recent months Dr. Phillips has said:

"These ores are exceptionally adapted for the manufacture of basic pig, carrying from 0.10 to 0.25 per cent. of phosphorus, and they exist in such quantities as strain the imagination. I have knowledge of 800 pits, trenches, etc., that were made on one property of 50,000 acres in East Texas, and not one of them failed to show workable ore. This ore carries more than 50 per cent. of iron, and can be mined, washed (when necessary) and loaded for 85 cents to \$1 per ton. Shipments of this ore to the Birmingham district—about 45

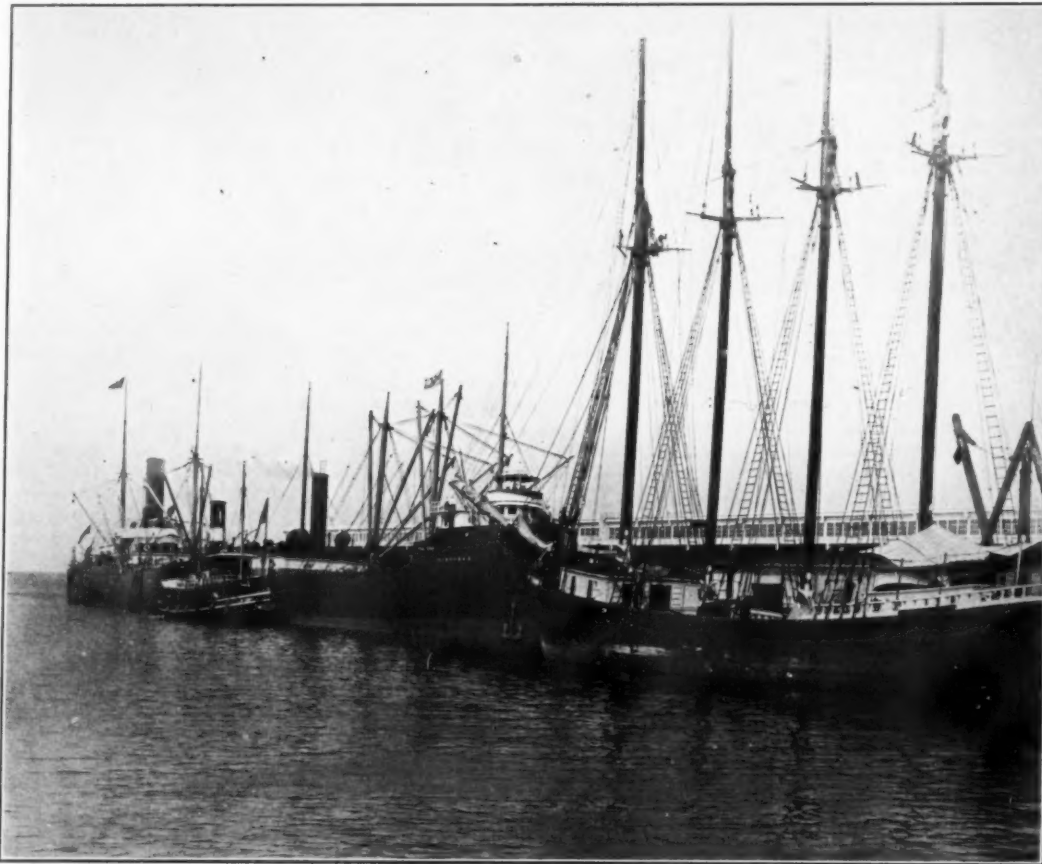
cars—showed more than 57 per cent. of iron, with phosphorus from 0.10 to 0.15 per cent. The shipment of about 600 tons that went to Philadelphia in June, 1910, showed more than 57 per cent. of iron, and the phosphorus was not above 0.20 per cent. in any of it."

The ores occur at the surface and down to five and seven feet. A loose, friable, sandy clay is associated with these ores, which is easily removed over a screen or an ordinary log washer. A steam shovel has been installed at the mines, and with a crew of 30 men to do all the work, including washing and loading, there will be mined and delivered 600 tons a day. The ore will be crushed, washed and sized, and it will all be of one quality, no sorting being required.

For delivery to ships at Port Bolivar, temporary ore docks have been constructed for immediate use, at a cost of some \$60,000. With these docks the cars are hauled up an incline by cable, the coal passing from hopper cars through four chutes to the ship by gravity. Boats can be loaded at the rate of 400 tons an hour.

W. G. Massenburg, division engineer of the Beaumont Division, Gulf, Colorado & Santa Fe Railroad, who built the temporary docks, is making designs for the permanent ore docks and pockets, which will be constructed at the earliest practicable moment. Mr. Massenburg has made a study on the ground of all the ore dock facilities at ports on the Great Lakes, and it is stated that the Port Bolivar docks will contain even greater facilities for rapid and economical operation than any now built. Without the pier which will be required, the permanent docks will cost about \$350,000. They will be provided with 50,000 tons storage capacity.

It had been expected that ore shipments would begin earlier than this, but unfavorable weather conditions and other hindrances have postponed the inauguration of the enterprise till some time in March. The railroad is now fully completed, going into commission in February, and mining machinery has been installed at the ore fields. Ore City, on the railroad, 24 miles from Longview, has been established as a trading center for the mining operations, and is expected to see a substantial growth. It is a fact of interest that the territory penetrated by the road has resources other than iron ore. A good many thousand bales of cotton, heretofore hauled long distances by wagon, will be carried by the road every season, as well as a minimum of 10 cars of pine lumber daily,



DOCK SCENE, PORT BOLIVAR, TEXAS.

Schooner Alice L. Pendleton discharging iron pipe from Philadelphia. Steamship Honduras discharging canned goods from Baltimore. Steamship Indianapolis loading lumber for Havana, it being the initial cargo of 1,500,000 feet, opening the lumber traffic of Texas through this port to Havana.

the road running through a part of the East Texas yellow pine belt. Beyond the present terminus of the road, along the route it will take when extended, there will be a hardwood belt of timber penetrated from which as much more lumber is expected to be daily shipped.

In all this work Col. L. P. Featherstone of Galveston and Longview has been the guiding and directing force. The president of the Gulf & Interstate Railroad, he knows what a railroad should be, and in the Port Bolivar Iron Ore Railroad he has as fine a piece of railroad as could easily be found. It is of standard, first-class construction, cut through the hills to the remarkably low grade of six-tenths of 1 per cent. Through his own efforts he financed and built the road, at a cost of about \$900,000, overcoming enormous difficulties and meeting many discouragements in the undertaking. The road will now be turned over to the Santa Fe System, to be operated by them on a lease.

The company owning and operating the iron mines is capitalized at \$2,500,000, Colonel Featherstone, L. C. Luckell and Fox Winnie being the incorporators. It is a notable fact that Colonel Featherstone and his associates retain their interests in these properties intact. The development work has been paid for without parting with the control or any other part of the stock. As is not always the case with enterprises of the kind, the originators will get whatever benefits that will accrue. None of the stock has ever been sold, and none ever will be, according to present ideas of the owners, for it is not for sale. Thus the enterprise will remain as it began—a Texas development.

In the case of the furnace developments, they will be made, when they are made, by men experienced in their line. The situation is being brought to the attention of men of this character, and they will be taken over the ground, so as to be made thoroughly familiar with every feature of the situation.

There is an opinion that a furnace and manufacturing development is not an impossibility at the grounds, and while iron manufacture has not been a conspicuous success under the auspices of the State at Rusk, it is pointed out that if every other condition were favorable, the political hue the State management has given to the undertaking would have been sufficient to hamper its efficiency. On top of this factor, however, has been the high cost of coke at this part of Texas. The theory on which is based the practicability of a manufacturing development here is that coke might be brought down from the North as a return cargo by the ore ships, and that it could be carried from Port Bolivar to the fields by the otherwise empty ore cars. Undoubtedly, the entire project will receive the most careful consideration in the early future, with such action as the conclusions of the investigators will suggest. Whether there will be a development both at Port Bolivar and at the fields or at only one of the two places, time will tell, but that a development will be made at one of the places at least is the confident belief of those interested in the undertaking, and of others who have given the subject careful investigation and thought.

An iron expert who had been on the ground wrote the Manufacturers Record a few weeks ago as follows:

"Recently I have read several articles bearing on the Texas ore situation, some setting forth the quality of the ore and predicting its future bearing on the Southern iron and steel industry; others sounding a note of skepticism. I have seen the Texas ore fields, and to me they are very attractive. The ore is very rich in metallic iron, running as high as 60 per cent., and it comes nearer being uniformly low in phosphorus than any brown ore extensively mined in the South. Even in the pig, the phosphorus is only a few points above the Bessemer specification. As to the use of this ore in a furnace, it is a fact that numerous failures have been made in Texas in the manufacture of pig iron at a profit, but these were not in any way attributable to the quality of the ore. Probably to a certain extent politics have been detrimental to the successful operation of the furnace plants in Texas in the way of politicians placing at their head inexperienced men, or at least not men with an 'eye to cost.' This, of course, had its bearing on the situation, but, above all, these failures were due to lack of cheap fuel. The furnaces had to depend on their coke supply from Virginia, Tennessee and Alabama, and, aside from the uncertainty on account of distance, the cost of the coke laid down at, say, Rusk was \$5.75 to \$6.25 per ton. This meant a cost of \$11.50 to \$12.50 alone for the coke. Under present conditions, with the exercise of the strictest economy and practical and efficient management, it would cost at least \$14 to \$14.50 per ton to produce iron at Rusk.

"The question of iron-making in Texas depends wholly on the solution of the fuel problem. I should not be surprised some day to hear of a good coking coal being found reasonably near, if not in, the ore district of the State of Texas. To my mind the abundance of lignite and low-grade coal indicates that there should be some 'ripe' coal in the State. If not, then there is another alternative. That is: if the railroads will haul the ore to a convenient point on the Texas coast for \$1 per ton—and it can be mined and put on cars at \$1 a ton—and if a satisfactory furnace coke can be laid down in Texas by water at \$3.50 per ton, which is not impossible, then iron should be made in that section at a cost dangerously near Birmingham's. Therefore, after all, the

Texas ore situation is not to be laughed at or made light of. The quantity and quality are there."

Port Bolivar contains exceptionally good shipping facilities. With 25 feet of water in the channel, vessels reach the open roads within 15 minutes from the time of leaving the docks. Already a very large lumber shipping business has been built up there. The Santa Fe Railroad, which will co-operate in the development of the iron industry in every lawful manner, being the chief beneficiary on account of tonnage to be built up, has the finest deep-water terminals at Port Bolivar that any road owns. It has 7200 feet of water front, with 30 feet of water, maintained by the Government, and back of that ground for several miles of additional track room. The development of Port Bolivar as an industrial center, as well as a shipping port, is believed to be inevitable. When iron works are established there, other industries will come as a matter of course.

Whatever course the details of the development may take in the final working out of the tentative plans of today, there is small room for doubt, as the Manufacturers Record has editorially declared, that Texas ore is destined to play an important part in the iron and steel industry of the country.

There are consumed in the United States today about 24,000,000 tons of iron per annum. If Texas consumed proportionately the amount per capita the rest of the country consumes, there would be required for Texas alone some 1,200,000 tons. Sooner or later there will be a demand for not only this amount, but a much greater quantity. At this time practically not a pound of the iron used in Texas is produced within the State. Some idea can thus be formed of the Texas possibilities in the line of iron and steel development if it were undertaken to supply the demands of this State alone. This refers to present requirements only, without taking into account what will be necessary to meet conditions to which the increased population of every year's immigration will contribute. It is manifest, therefore, that the local demand should be sufficient for a very considerable development of the iron and steel industry as soon as the manufacture is established on a competitive basis, as the plans of the company contemplate, as a matter of course.

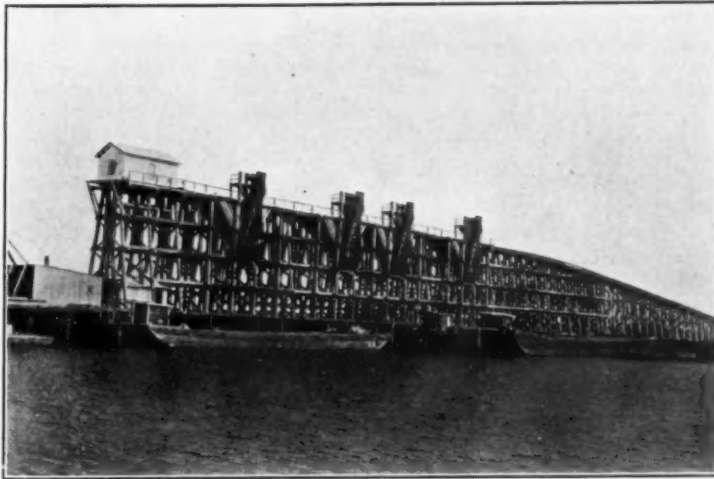
The location of Port Bolivar is one of strategic importance in this connection. It is a part of the Galveston district development, which is destined to see an ever-increasing growth in population, wealth and commerce. No one can foretell the extent or rapidity of this growth, but anyone familiar with the progress of events must realize that every port on the Galveston Bay where deep-water facilities are provided must come into use for the commerce and trade the completion of the Panama Canal will develop.

Port Bolivar will thus be a necessity as an accessory to the facilities required for handling the export and import trade of this section. Already a great lumber exporting port, it will grow in other lines, based on the remarkably complete and extensive railway terminal facilities the Santa Fe System has provided and the deep water found right at the docks.

Those who are behind the ore development realize the possibilities of the situation, and are proceeding along carefully-worked-out, thoroughly-considered and eminently practical lines. No move is being made in haphazard manner or based merely on hope and untried optimism. Whenever the coke oven and the furnace are decided on, it will be because every factor in the situation has been worked out to a demonstration of its practicability.

The possibilities of a many-sided and most important development following the establishment of an iron and steel industry at Port Bolivar are altogether obvious.

From present indications it seems merely a matter of time—and a short time at that—when such a development will occur, with benefit to the entire section of an almost incalculable extent and variety.



ORE DOCK AT PORT BOLIVAR, TEXAS.

Finished January, 1912, to handle brown ore shipped from East Texas mines to Atlantic seaboard. Height above tide, 53 feet; length dock proper, 324 feet; approach, 10 per cent. grade; cable hoist; capacity, 400 tons per hour; operated by three men; designed by W. G. Massenburg, Div. Eng. U. S. F. R. R.



NEW CONSTRUCTION FOR ADDITIONAL LUMBER FACILITIES AT PORT BOLIVAR.

The Gulf, Florida and Alabama Railway

OF many railroad enterprises now being pushed forward in various portions of the South, there is none that promises greater profit for its builders or broader development for the country through which it passes, from its initial point to its final terminus, than the Gulf, Florida & Alabama Railway, now being constructed from Pensacola, Fla., to Jasper, Ala. This road, while designed to become a heavy coal-carrying line from the immense undeveloped fields of Alabama to the great Gulf ports, thence to go out by water transportation to the various established markets, will immediately become an important factor in the transportation of the immense shipments of finished steel products from the Birmingham district destined for the export trade. Year by year sees a steadily-increasing volume of business sent to the Southern mills of the United States Steel Corporation and other similar interests for fabrication for foreign ports, and in this business this railroad cannot fail to share largely. But it is not only in the coal and mineral resources of Alabama that the road will find its business, for its route lies through agricultural land of great productive power, now extensively given over to the raising of cotton, corn and other farm products. The road traverses for nearly 100 miles of its length the premier cotton producing section of the State of Alabama. Nearly the whole of this crop goes to export, and is now moved by circuitous routes, but, with the advent of this new road, will be handled on much shorter mileage basis and much more expeditiously than by any means at present existing.

The Gulf, Florida & Alabama Railway, originating at Pensacola, will run through the counties of Escambia, Florida; Escambia, Monroe, Clarke, Wilcox, Marengo, Hale, Tuscaloosa and Walker, Alabama, and will have railroad connections as follows: With the Louisville & Nashville at Pensacola and Cantonment, Fla., and Atmore and Thomaston, Ala.; with the Southern at Pine Hill, Uniontown or Faunsdale, Greensboro and Jasper, Ala.; with the Alabama Great Southern (Queen & Crescent Route) at Tuscaloosa; with the Mobile & Ohio at Tuscaloosa; with the Frisco System and the Illinois Central at Jasper. This will furnish it excellent connections for all parts of the country, and will bring many of the best manufacturing points in various States into close touch with the port of Pensacola.

Sixty miles of the line, from Cantonment, Fla., to Local, Ala., is now built and under lease, but is not as yet being operated as a common carrier. On 20 miles of the line, extending from Pensacola to Muscogee, to a junction with the completed portion, near Cantonment, work is being pushed rapidly. These two portions, with an extension running north to Jones Mills, upon which work will be begun at once, will be put into operation during the approaching spring or early summer, establishing a regular passenger and freight service in and out of Pensacola for about 90 miles.

Monroe, Clarke and Wilcox counties will undoubtedly show unprecedented growth as a result of the building of this road, these counties having now totally inadequate railroad facilities. In these counties are situated immense tracts of the finest white oak, hickory, chestnut and other hardwoods to be found in the State of Alabama, and great activity is already apparent through the district in the way of preparing for marketing the products of these immense forests as soon as the construction of the road into the territory affords proper transportation facilities.

The line from the southern boundary of Hale county north to Tuscaloosa splits the famous "Black Belt" or "Canebrake" country of Alabama squarely in two. At Tuscaloosa the road enters an immense boundary of coal, the value of which, measured by the British thermal test, is equal to that of the best bituminous coal from any other part of the entire country. This great field, embracing some of the finest coal deposits in the famous Birmingham district, is totally undeveloped, but the advent of the railroad will be followed by the establishment of great mining plants, and it will soon become one of the great coal-producing fields of the South.

The Gulf, Florida & Alabama Railway, with its magnificent tidewater terminals at Pensacola; with its line laid through a totally undeveloped territory, than which there is none richer on the continent; with its connections at various junction points with such trunk lines as the Southern Railway, the Queen & Crescent, the Illinois Central, the Frisco and the Mobile & Ohio, will occupy a very strong strategic position, and will undoubtedly be a large carrier of through routing of merchandise from the immense producing districts of the Middle West, destined for export to South and Central America, and for European ports as well. The completion of the Panama Canal and the inauguration of steamship lines touching at the Gulf ports and utilizing the canal for service along the west coast of South America will find in this road an important originator of freight intended for those destinations.

The road will also represent the short line mileage from the Warrior coal fields of Alabama to deepwater on the Gulf, and will therefore inevitably be-

come a heavy carrier of coal for bunker delivery at Pensacola; also for coal for export to South American and other foreign countries.

Pensacola is situated on one of the finest harbors on the eastern coast of the United States, certainly the finest on the Gulf of Mexico. A minimum depth of 35 feet of water is obtained at all times over the outer bar, while inside the Bay of Pensacola is situated a roadstead of some six square miles in extent, in which a depth of from 40 to 50 feet prevails. The harbor front property obtained by the road for its marine terminals is ample for its needs for all time to come, and represents the very choicest location of the available water front in the city of Pensacola.

The designs of the company's engineers for these marine terminals are now nearing completion, and bids have already been asked for executing some of the work. These plans contemplate the construction of six concrete solid filled piers, each 100 feet in width by 1200 feet long, with slips between the same of 200 feet in width and a depth of water of 30 feet at all times. At the inboard end of these piers there will be a terminal yard of some 50 acres in extent, an export lumber yard, naval stores yard and cotton warehouses. A modern coaling dock, with overhead bins for loading into ships' holds or bunkers, will be provided.

The construction of the road compares favorably with that of any similar property in the South. The maximum gradient against traffic is limited to .75 of 1 per cent.; the maximum curvature to six degrees. The track is laid

with 70-pound steel. Only the best workmanship and materials are being accepted, and there can be no doubt that operating costs will be as low on this road as upon any other in the entire South.

One of the best evidences of the need for and future success of this road is shown by the activity of the people of such towns as Faunsdale, Uniontown, Greensboro, Marion, Monroeville, Thomasville, and even Selma, to induce the officials to assure them that the projected line will pass through their respective towns.

Nor is the necessity for such a road confined to the outlying territory through which it is to pass. Pensacola, one of the oldest towns in the country, has just felt the awakening touch of a new life, and has sprung into an activity hitherto unapproached in her history. Possessed of the greatest natural harbor on the Southern coast, in which vessels drawing 30 feet of water can enter under full sail, and inside which the navy of the nation could safely ride at anchor, secure from the storms both of nature and of war; backed by a country of unsurpassed fertility of soil and possessed of a climate that produces anything that grows from the ground, from the corn and oats of the North to the subtropical orange and grapefruit, Pensacola has yet lacked the railroad facilities to render her great as a port or as a modern municipality. The Gulf, Florida & Alabama Railway will go a long way toward the solution of the transportation problem, for its line, running approximately 300 miles due north, is not only destined to develop a large traffic-creating country along its line, with lumber, coal and cotton and all kinds of farm products seeking over it an entrance to a great exporting port,

but it will form such connections as will give the agricultural and manufactured products of the Mississippi Valley—its wheat and oats, its cattle and its corn—the best outlet to the world's markets; will put in touch with the port of Pensacola the manufacturing centers of Chicago, St. Louis, Cincinnati and other communities of the Middle West, through which they will find easiest and cheapest outlet to those foreign countries in which their manufactures are most in demand. With such connections as these it takes no prophetic eye to see the harbor of Pensacola rippling with waves from the bows of ships from every sea, white with the sails and flaming with the flags of all earth's ocean-going peoples.

The shops of the Gulf, Florida & Alabama Railway will be located in Pensacola for the maintenance of the motive power and rolling stock, ample provisions having been made for ground on which to build them, and adjoining them will be storage and classification yards, roundhouse, coal chutes and other auxiliary facilities. The passenger station will be on one of the main streets, within three blocks of the business and hotel center of the city, and within one block of the electric line.

The Gulf, Florida & Alabama Railway Co. is a corporation organized under the laws of the State of Florida, and having its home offices in that State. Its officers are Roy C. Megargel of Megargel & Co., bankers, of New York, president; William H. Knowles, banker and capitalist, of Pensacola, and G. A. Berry of Pensacola, vice-presidents; Henry Hyer of Pensacola, secretary; W. K. Hyer, Jr., of Pensacola, treasurer; G. A. Berry, general manager and chief engineer.

The fiscal agents of the company are Megargel & Co., 5 Nassau street, New York.



The Baltimore Steam Packet Company

(The Old Bay Line)



INTIMATELY associated with the history and commercial development of Baltimore is the growth of the Baltimore Steam Packet Co., familiarly known as the Old Bay Line, the pioneer steamship company of the South. Indeed its history runs parallel with that of steam navigation itself. In the year 1840 several of Baltimore's most prominent and public-spirited citizens formed a company which had for its object the development of transportation facilities of the port by establishing a regular line of fast passenger steamers to ply between Baltimore and Norfolk. This was the origin of the Baltimore Steam Packet Line, which has had such influence in the commercial development not only of Baltimore, but of Norfolk, Portsmouth and other cities which have benefited both directly and indirectly by its operation.

The first passenger steamer on the line was the Georgia, 194 feet long, 24 feet beam, of 552 tons, built of wood, and having paddle wheels. The Georgia was a "marine marvel" of that day.

In 1877 and 1878

the Carolina and the Virginia, two splendid steamers constructed of iron instead of wood, were added to the fleet. These were among the first steamers ever lighted throughout by electricity.

The construction of the combined freight and passenger steamer Georgia in 1887 proved of inestimable value to the shippers in the saving of time, as it made possible the placing of shipments in Norfolk in 11 hours from Baltimore. Thus the day after leaving Baltimore such shipments were on their way to the South and Southwest by rail from Norfolk.

From close observation of the Georgia for several years the company evolved, under the direction of the president, Captain John R. Sherwood, the Alabama, which was launched in 1892. Of this steamer it is asserted that in her construction she was a quarter of a century ahead of any improvement that could be utilized to greater advantage in passenger steamers. The Alabama was constructed under the rules of the United States Standard Shipbuilders and Underwriters' Association. The hull is entirely of steel and is classed A1 for twenty years, the highest class that can be given. A novel feature of its construction is that the sides of the hull were given a "flare" of some two feet from the water line to the guards and reinforced by steel beams, thus giving added strength and making her one of the steadiest boats afloat in a seaway. Water-tight bulkheads minimize the danger from collision or other accident. The bow also received special attention by doubling the frames and the plating. To obviate vibration, triple expansion engines were installed, using four cylinders. Her dimensions are: Length over all, 310 feet; breadth of beam, 43 feet; over guards, 55 feet; depth of hold, 18 feet 6 inches; tonnage, 2000. She can accommodate 400 passengers, has state-rooms with private baths attached, is fitted with electric lights throughout, is steam heated, supplied with electric call bells, and has a large searchlight of 16,000 candle-power. The Old Bay Line is the first company south of New York to install the wireless telegraph system on its steamers, all the boats of the line having been equipped by the United Wireless Telegraph Co.

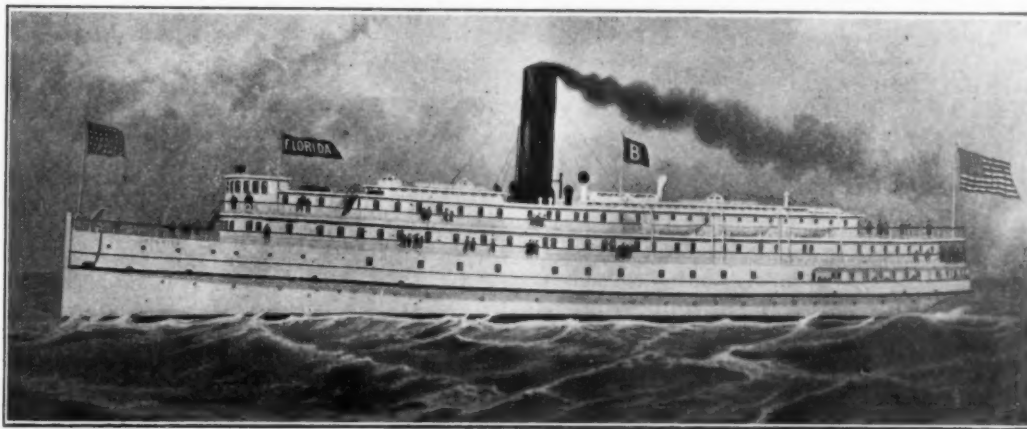
In 1905 the steamer Virginia was added to the fleet, and in 1907 the Florida, the latter of which is shown in the illustration and is the flag ship of the company. The description of the Alabama virtually applies to all three of these "Greyhounds of the Chesapeake."

Everything that can contribute in any way to the comfort and convenience of the passengers has been utilized to the best advantage, with the result that the service on an Old Bay Liner equals, if it does not surpass, that of the best metropolitan hotels, besides affording the delights of travel by water on a safe and protected inland sea. The special attention paid to the cuisine has made the meals served on the Old Bay Line famous the world over. The Baltimore terminal facilities include Piers 9, 10, 11, 12 and 13 Light Street, where they occupy a street frontage of 350 feet on Light Street, and where four steamers can load or unload simultaneously. A receiving station is also maintained at Brown's Wharf, foot of Broadway, and Union Dock, Pier 5, Pratt Street, as a convenience to the merchants of the eastern section of Baltimore. The Old Bay Line has always carried the preponderance of the produce from the truck farms of the Hampton Roads section, reaching Baltimore by water, a class of trade to which it caters by having extraordinary ventilating facilities, thus enabling shipments of fruits and vegetables to reach this market in excellent condition. When Union Dock (Pier 5, Pratt Street) was rebuilt by the city after the disastrous fire of 1904, it was leased by the Baltimore Steam Packet Co. for the special purpose of handling truck, for which, on account of its location and size, it is admirably adapted. This dock has always been recognized as the great wholesale market for all vegetables and fruit reaching the city by water from the South.

The tidewater terminal of the company at Norfolk is located at the foot of Main Street and possesses every modern facility for the expeditious loading and unloading of freight, ample accommodation being provided for the handling of the largest cargoes. At Portsmouth the facilities are also ample and the service prompt. In addition to the fleet of passenger steamers, two freight steamers, the Raleigh and the Gaston, are utilized to handle the ever-increasing freight handled by this company.

The general offices of the company are located at Baltimore. The president and general manager of the company, Captain John R. Sherwood, has been closely identified with the Old Bay Line for almost his lifetime. P. Byrd Thompson is traffic manager and James E. Byrd is general passenger agent.

A service is maintained between Baltimore, Old Point Comfort, Norfolk and Portsmouth every day in the year, the steamers leaving each terminal at a convenient hour in the evening and arriving at destination the following morning. The Baltimore Steam



"FLORIDA," "VIRGINIA," "ALABAMA."

Packet Co. was the first to inaugurate daily sailings, including Sundays, between these points, which service dates from August 21, 1910. A great advantage of travel by this route is that a quiet, restful night is obtained, which is particularly appreciated by travelers to and from the South, who thus break a tiresome rail journey with a night on the water. Through tickets and baggage checks and through bills of lading for freight permit this connecting link between the North and South to be utilized with every possible advantage in its favor.

Faith Without Works is Worthless

Every section is judged as to its enterprise by the energy of its people in making known to the world their own faith in their country.

Faith without works is of no effect.

You may claim faith great enough to move mountains, but if you do not back your faith with evidence that it is a living, working reality, you will never move even an ant hill.

You may have unbounded faith in the richness of the South's resources, in the attractions of your town or city, in the merits of your individual business, whether it be making pins or operating a railroad, but unless you throw the energy of your life into letting the world know the quality of your pins or the advantages of the country tributary to your line or its facilities for travel, you will never accomplish much for the upbuilding of your town, for the selling of your product or the creation of increased transportation business.

In this issue many towns and cities, many industrial and financial concerns, many transportation companies, have demonstrated that with them faith and works go hand in hand, so they are making known through these pages what they are doing and why they seek your co-operation in the enlargement of their operations.

A more splendid array of great business institutions, of railroads, of towns and cities of exceptional advantages as advertisers was, we believe, never before gathered into any publication.

We commend them to our readers: study every page—note how some cities and towns are growing with amazing rapidity, and how they present these facts in a way worthy of the highest magazine story of the ablest writers; investigate these advantages; look carefully into all that is to be found in these many advertising pages of this publication, and in seeking additional information be sure to mention the Manufacturers Record.

Culminating Work of Constructive Upbuilding

Louis B. Magid and His Development of the Largest Apple Orchard in America

SOMEONE tells a story about the pessimistic character who returned to his home town after an absence of several years only to find it grown beyond his knowledge. "Why," said he, "there stands a bank on the very land that wasn't worth paying taxes on when I owned it. It's surprising." The answer was that if the land had never changed hands it would still have been worthless. The land was all right. And that is the situation pretty nearly everywhere. Not that one piece of property is not better or worse than another, but that its value depends so altogether upon the energy, the care and ability expended upon it. A truism, certainly, and yet how comparatively recent it was that much of the finest land in the South was unproductive simply because it had not been made to produce. The possibilities thrust themselves upon all, but the actual reaping of generous harvests fell to the men who were ready to take the initiative to begin the work. The South can beat Oregon or Washington in apple growing, but our people are only now beginning to see the real meaning of this fact.

It will be a matter of news to many to hear that there is now under development in Habersham and Rabun counties, Northeast Georgia, for commercial apple-orchard purposes a tract of land several thousand acres in extent which possesses the many advantages that experienced men consider necessary for the most profitable apple growing. This undertaking is a work of such magnitude and such possibilities that one naturally raises the question as to what is behind it all and who is responsible for its inception.

The prime mover in the enterprise is Louis B. Magid, who has been identified with so many important works in that section of Georgia in the past few years that it may not be amiss to enumerate some of his activities. It will be seen that his commercial apple-orchard idea follows in the train of many other successful pursuits, and it may be regarded as the culmination of his labors and in a great many respects the goal of his ambition.

Mr. Magid's interest in Northeast Georgia is not entirely material, for there is a strong sentimental side, and not without reason. It was in this beautiful mountain region that he met Miss Righton Habersham of Savannah, who afterwards became his wife. Mrs. Magid is a direct descendant of James Habersham, the first Secretary and the second Governor of the Colony of Georgia, following Governor Oglethorpe in that honorable position. He was also the first Postmaster-General of the United States, holding that portfolio in the Cabinets of Presidents Washington, Adams and Jefferson. The name of Habersham is written largely in the history of Georgia, and is perpetuated in the county where Mr. Magid has concentrated his activities.

Although Mr. Magid is not a Southern man, he came to the South at an early age after having received his education and technical training in the North and abroad. His first work after coming to Georgia was to push to completion the extension of the Tallulah Falls Railway from its terminus at the falls to Franklin, N. C. Certainly more than the usual difficulties attended this extension for the reason that, aside from the extraordinary engineering problems, he and his associates were greatly hampered by lack of capital.

Mr. Magid's engineering skill and his untiring energy made possible the accomplishment in a comparatively brief period of what otherwise could not have been done for many years to come. The extension when completed was over 40 miles in length and cost in the neighborhood of \$1,500,000, it being one of the most costly stretches of road anywhere in the country. The opening up of the road made possible extensive agricultural operations, and it has become an important link in the Southern Railway, of which it is now a part.

The wide knowledge of Georgia which the building of this railroad gave Mr. Magid enabled him to see very clearly and to have impressed upon him very strongly the many opportunities for development of every character which this region possessed, and the railroad was no sooner completed than he began to interest himself in a practical manner in the water-powers. His first step in this direction was to secure several thousands of acres of land in the mountains, which carried with them the water rights of that territory. He was later much gratified to find that careful surveys and investigation on the part of other engineers confirmed his own belief in the immense value of these unutilized water-powers.

Franchises were secured in the city of Atlanta, and here, again, is his constructive genius shown in the manner in which he completed the organization of a strong company with \$6,000,000 of securities approved by the Railroad Commission to further the development. Associated with him as directors in this company were men whose names are well known in financial circles—Wm. L. Peel, president of the American National Bank; Wm. M. Nixon, president Atlanta Woolen Mills; David Woodward, president Woodward Lumber Co.; Sam D. Jones, president Atlanta Stove Works; James W. English, Sr., president Fourth National Bank; J. S. B. Thompson of the Southern Railway; S. F. Parrott, president Atlantic Compress Co.; Albert Howell, Jr., a well-known lawyer; J. Pope Brown, then treasurer of the State of Georgia, and Thos. D. Meador, vice-president Lowry National Bank, all of Atlanta. The name of the company was the Atlanta Hydro-Electric Power Co., and it was rated as one of the largest electric-development corporations in the United States. The company was recently merged with the Georgia Railway & Electric Co. into a \$57,000,000 corporation, known as the Georgia Railway & Power Co.

Mr. Magid has other power holdings in addition to the Tugaloo project, he being president of the Appalachian Electric Power Co., which owns valuable power sites on the Chattooga River, Panther Creek and other streams. These sites were secured at the same time that he purchased the Tugaloo property.

Mr. Magid's present activity is largely given to the banking firm of Louis B. Magid & Co., with headquarters in the Candler Building, Atlanta. Particular attention is given to municipal securities by purchasing outright the bond issues of good municipalities. This means not only profits for the banking house, but it offers genuine help to progressive Southern cities in need of capital for furthering civic improvements.

The broad experience which Mr. Magid gained in his various enterprises simply served to impress him more strongly with the tremendous opportunities in these Georgia hills, and in time he was enabled to turn his attention to the matter which he had been considering for a long period—that is, the development of a commercial apple orchard or apple raising on a large scale. The conclusion that such a development would be profitable and desirable was not reached at once; in fact, it was only after careful experiment and investigation of apple orchards on a small scale that he made any attempt to work out the larger problem.

The appearance and quality of the apples raised by others in Habersham county, who became interested, enabled them to win two prizes at the International Apple Exposition at Spokane, Wash. This offered pretty concrete evidence that apple growing could be successfully conducted in Northeast Georgia, and Mr. Magid began immediately to perfect his plans for working out a development on a scale hitherto unattempted in that part of the country. The Appalachian Apple Orchards was organized with a paid-in capital of \$250,000, with privilege of increasing to \$5,000,000. None of the stock was sold to the public and none will be offered. Early in the fall of 1911 active operations were begun, and Mr. S. W. Cole of Virginia, a practical horticulturist, formerly of the National Department of Agriculture, was engaged as superintendent. A large force of men was put at work cutting down trees and clearing the ground of stumps. A miniature village has sprung up, composed of the superintendent and his men, who have charge of the clearance and the preparation of the ground.

In the mind of Mr. Magid there was no doubt about the correctness of his judgment in making plans for an orchard development of such magnitude, but realizing that he had not simply himself to consider, but the interests of many who had been and who would be associated with him, he took the trouble and expense to secure the services of Dr. Geo. T. Powell, president of the Agricultural Experts' Association of New York. After a thorough personal investigation Dr. Powell made a highly satisfactory report, which may be briefly summarized as follows:

The location is an ideal one, possessing many favorable natural advantages—first, high elevation, the tract being 2000 feet above sea level, insuring proper circulation of air and protection against frost.

Natural drainage: perfect. Need of irrigation: none.

The soil is a red loam, very uniform and possessing sufficient gravel and silica to insure proof of fertility and retention of moisture. Both soil and climate are especially adapted to such varieties of apples as Grimes' Golden, Stayman's Winesap, Red Astrachan, Rome Beauty, Red June.

Trees are of unusual vigor and remarkable in their freedom from any serious disease. Especially favorably situated as regards markets by reason of the fact that the latitude of this tract insures a very early spring and a long growing season, making it possible for ripe apples from this orchard to be placed on the market in the principal centers of population some three weeks in advance of the time at which they can be secured from any other section.

When completed this orchard will be of such a size and character as to command the attention not alone of the State, but of the entire South and of the North and West as well; in fact, even in its present stage it has attracted wide notice, bringing to Mr. Magid inquiries regarding apple culture in Georgia from all parts of the country.

It may be stated as axiomatic that the profits in horticulture depend on certain conditions that may be roughly classified as natural, which includes location of the land, character of the soil, etc., and, secondly, all other conditions involved in the development, such as management, financing and the character of the men behind the project. The facts above given show quite clearly that the necessary conditions have been most satisfactorily met. Dr. Powell's report, as well as the experience of the local apple growers, demonstrates that no mistake has been made in the choice of the land to be developed. The success which Mr. Magid has achieved in his other enterprises and the confidence in which he is held by those who know him is the strongest kind of a guarantee that not only the executive affairs will be correctly handled, but that the details of the organization will be properly carried out.

There will be no large tracts sold, and it is not considered likely at this time that over half of the entire holdings will be disposed of. The object will be to interest as many people as possible and secure a large number of investors who will cause the development to assume a wider plane and give it a greater influence. The plan of sale does not contemplate a division of the property, but provides for its operation as a whole. Greater economy is thus secured, as under one management the cost of production is less and the profits are proportionately more in a large orchard than in a small one. It is intended that an opportunity be given here to the small investor to share in an industry that will yield returns which he could not secure with safety from an investment in an enterprise of smaller character.

The orchard company's office is in the Candler Building, Atlanta, Georgia.

The Chesapeake Steamship Company

("Chesapeake Line" "York River Line")



FROM Fort McHenry, which gave birth to the "Star-Spangled Banner," to Hampton Roads, where the life of the nation hung in the balance during the terrific engagement between the Merrimac and the Monitor, the first naval battle between ironclads in the world's history; to Jamestown, where 300 years ago was planted the colony that made this nation a possibility; to Norfolk, predestined, like Baltimore, to be one of the world's great cities, the Chesapeake Bay is rich in historic associations. When Nature gave to this region the Chesapeake and its tributaries, it blessed it with one of the most beautiful bodies of water on earth, and undoubtedly the richest known to man for any similar area, in the variety, abundance and quality of its fish, its oysters, its terrapin and its crabs. No other body of water on earth can match the Chesapeake Bay in this respect. It is to the terrapin, the oysters, the fish, the crabs and the canvasback ducks of the Chesapeake that Baltimore's reputation as the "gastronomic center of the world" is mainly due.

It is appropriate, in view of these facts, that travel on the Chesapeake Bay should be in keeping with these rich resources and with these historic associations. It is likewise to be expected that the two great cities of Baltimore and Norfolk-Portsmouth, one at the northern and the other at the southern end of the bay, should be connected by steamship facilities worthy of their population and wealth. The Chesapeake Steamship Co., operating the popularly known "Chesapeake Line" between Baltimore, Old Point Comfort and Norfolk, and the "York River Line" between Baltimore, York River landings and West Point, Va., where direct connection is made with the Southern Railway for Richmond, has provided steamship service worthy of the situation. The magnificent new twin steamers "City of Baltimore" and "City of Norfolk," which provide a daily service between Baltimore, Old Point Comfort and Norfolk, represent the latest word in marine architecture, embodying in their construction and equipment every safeguard, convenience and luxury that modern shipbuilding has made possible. The length over-all is 310 feet, with a breadth of beam over guards of 60 feet. Each has a freight capacity of 650 tons, with passenger accommodation for 400. The hulls are of steel. The power is furnished by four-cylinder triple-expansion engines, giving high speed, with no unpleasant vibrations. The most modern hotels do not furnish better accommodations for the comfort and convenience and safety of their guests than can be had on these boats. The safety and convenience alike of passengers are assisted by a wireless system of telegraphy by which they can communicate with friends or business associates as readily as though they were on land.

A complete fire-extinguishing system is maintained, and frequent drills and inspections keep the crew and equipment in a high state of efficiency. On each of these steamers there are 137 large, well-ventilated staterooms, most of them having windows opening to the outer deck. Every stateroom is supplied with running water, the outlet pipes running overboard, thus obviating the necessity of water pitchers and standing water in receptacles. There are 39 staterooms on each steamer which either connect with private baths or are supplied with shower baths. These private baths may be obtained in connection with some of the smaller staterooms, as well as with the larger ones. In addition to these private baths there are two general bathrooms for the use of passengers. All baths, plunge and shower, are supplied with hot and cold, fresh and salt water, and are completely fitted out with every modern improvement. As a sanitary measure, and in keeping with the high standard of every feature of the interior fittings, not a wooden bedstead is found on these vessels.

The cuisine of the Chesapeake Line is famous for its excellence. Able to draw, as its commissary department is, upon the unlimited market facilities of Baltimore and Norfolk, and with the great care given not only to the quality of the food, but to its cooking and its service, the traveler by these boats can count on the best of food. The company in building the "City of Baltimore" and the "City of Norfolk," following its usual custom, put the dining-room on the gallery deck, which gives a bright and airy dining-hall, with a splendid view over the water.

A complete telephone system connects every stateroom and the purser's office with a main exchange in constant charge of an efficient operator. Immediately upon the steamer's reaching the dock the company's private exchange on shore is connected with that on board the steamer, and direct connection is thereby established between the vessel's telephone system and the city exchange for local and long-distance calls. The wireless service supplied by

the United Wireless Telegraph Co. makes communication possible to the outside world at any time during the trip.

By means of railroad and steamship connections at Baltimore, Old Point Comfort, Norfolk and West Point, passenger and freight service is maintained via these steamers to all points beyond.

Through tickets are sold from railroad points via the Chesapeake and York River lines, and baggage may be checked through to destination from residence to residence in all cities where transfer baggage express companies operate. Through bills of lading are issued by connecting lines.

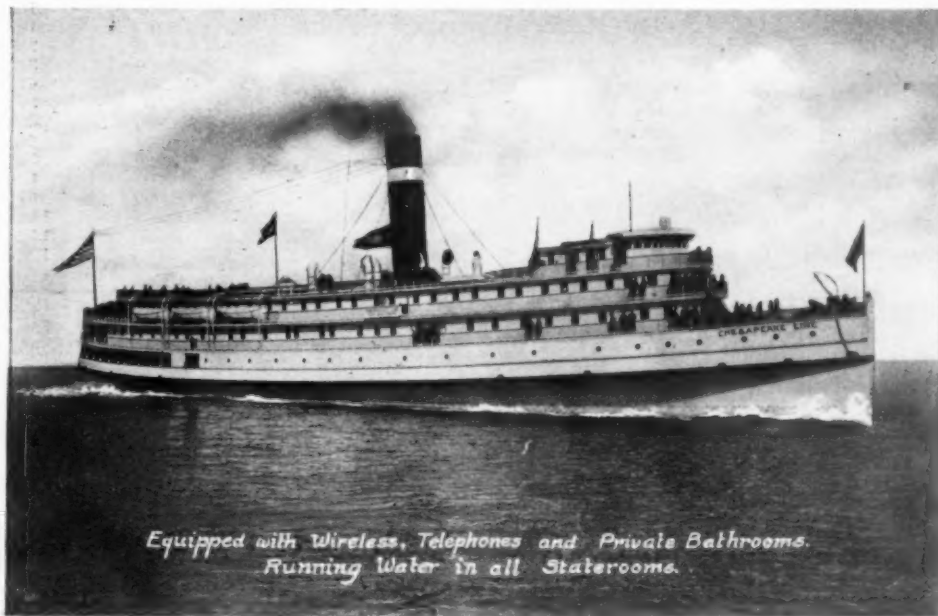
Cold-storage facilities are provided so that perishable goods are kept in condition and transferred direct from cold storage on the steamer to cold-storage railway cars.

In Baltimore the company's terminal is at Piers 18 and 19 Light street, easily reached by street cars running directly past the wharf, while regularly operating omnibuses transfer the passengers between the steamers and railroad depots. Stop-over privileges are allowed on all first-class tickets.

The "Chesapeake Line" steamers leave Baltimore and Norfolk at a convenient hour in the evening every day in the year, and arrive at destination at a convenient hour on the following morning. This gives their passengers a restful night on the water on a

safe and delightful inland sea, with all the attractions of steamer travel, making a pleasant break in a fatiguing railroad journey. The "York River Line" steamers leave Baltimore on Tuesday, Thursday and Saturday evenings, arriving at West Point, Va., the next morning.

Mr. Key Compton, the president of this company, has long been identified with the steamer interests of the Chesapeake Bay. Under his progressive management these splendid boats have been built with the view to the safety, comfort and pleasure of every traveler. E. J. Chism, the general freight and passenger agent; M. Chapman, the assistant passenger agent, and A. L. Myer, the assistant freight agent, are active co-workers with Mr. Compton in the management of the varied details so essential to the progress and prosperity of the line, and so essential to the welfare and comfort of the passengers.



Equipped with Wireless, Telephones and Private Bathrooms.
Running Water in all Staterooms.

"CITY OF BALTIMORE."

"CITY OF NORFOLK."

The People Who Have Made This Issue Possible

As a man is known by the company he keeps, so a newspaper is known by the character of its advertising pages and the standing of the business concerns which make their announcements through its columns. Clean advertising pages are just as essential as clean editorial and news pages. The Manufacturers Record always seeks to make admission to its advertising columns a proof of good character. We may sometimes be mistaken, for in dealing with thousands of concerns we cannot always be certain of the character of every one, but we rigidly exclude everything that has the appearance of fraud, and under no conditions accept advertisements of liquors, patent medicines, oil or mining stocks, even though some of the latter may be glittering. Many of these things have a bad reputation, and so, in justice to our readers and advertisers and ourselves, none are accepted.

We are willing to be judged by the character of company we are keeping, and we point to the advertisers in this issue as illustrating the influence of the Manufacturers Record with the great business institutions which are making the South. Their hearty co-operation makes possible the publication and the wide distribution of this issue throughout this country and abroad. We believe this publication will do more to advertise the South in the best possible way than anything ever done before, and that many millions of capital and many thousands of men and women will take up the Southward march as a direct result of this work. We feel, therefore, that every advertiser is joining in a great campaign, not simply for the advancement of his own interests, but for the broadest upbuilding of the South to the benefit of every town and city and every business institution in the whole section.

Every man interested in the welfare of the South should mail copies of "Thirty Years of Southern Upbuilding" to his business friends in other sections.

Tampa, Florida, the Greatest Port on the Gulf Coast

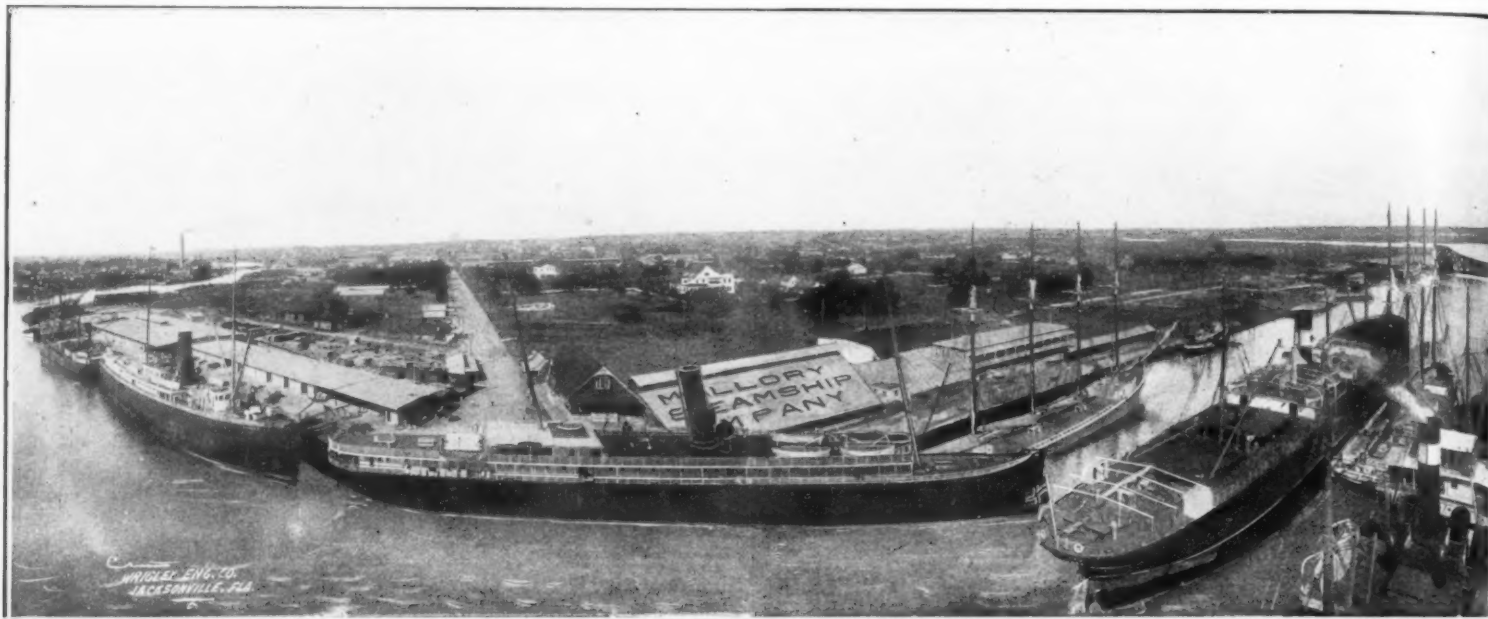
A City of Great Opportunities and Splendid Achievements



IN 1539 Hernando De Soto and his intrepid Spanish followers first planted the standard of European civilization in the soil whereon now stands the city of Tampa, and almost a century ago the United States Government established there an army post, known as Fort Brooke. Yet three and a half centuries after the Spanish first landed there, and more than half a century after the American flag was unfurled over it, Tampa, in 1880, had a population that numbered but 720 souls. By 1890 the number had increased to 5532. When in 1898 the United States declared war against Spain, and it became necessary to assemble large bodies of troops to be held on the seaboard ready for transportation to Cuba, it was seen that Tampa was the best place on the coast of the Gulf of Mexico from which to get an army into that country quickly. Thousands of men were therefore poured into Tampa from various States to the north and west, some of whom took ship and were carried to the seat of war, but the vast majority of whom were held in camp a few months and then returned to their homes. It wasn't much of a war in the matter of battles fought or men killed, but it

To show that these increases were equaled by those made along other lines the following figures are given:

Year.	Cigars Shipped.	Tons Phosphate.	Building Permits.
1897.....	90,408,000	168,788	\$137,000 00
1898.....	85,144,000	169,916	198,000 00
1899.....	111,670,000	184,849	.....
1900.....	147,848,000	296,203	268,000 00
1901.....	147,330,000	326,000	304,588 00
1902.....	141,905,000	412,091	671,863 00
1903.....	167,630,000	370,794	807,000 00
1904.....	196,961,500	439,789	1,074,432 00
1905.....	220,430,000	448,445	1,070,000 00
1906.....	277,662,000	529,268	1,282,415 00
1907.....	285,660,000	602,078	1,395,054 00
1908.....	236,681,000	971,020	1,260,255 00
1909.....	267,059,000	1,041,800	1,550,453 00
1910.....	201,405,000	1,120,384	1,685,586 00
1911.....	293,360,000	1,224,253	2,012,112 00



DEEP SEA HARBOR, TAMPA, FLA.

was mighty in its bearing upon the future of Tampa, for it demonstrated the fact that it was the best place at which to embark an army necessary to be sent into any country on the Atlantic seaboard south of the Florida peninsula. The United States Government, seeing through the eyes of its trained and accomplished officers, recognized that fact and placed upon Tampa the seal of its approval as a port.

Those few months of war's alarms in 1898 did more to make a city of Tampa than had been done by all the circumstances of the preceding years, for it riveted upon it the attention of the commercial world. From a population of 5532 in 1890 Tampa bounded up to 15,839 in 1900; internal revenue receipts increased from \$280,205 in 1897 to \$496,560 in 1900; customs receipts from \$638,515 to \$871,377, and postoffice receipts from \$27,282 to \$33,900 during the same period, while building permits rose from \$137,000 to \$304,588, cigars shipped from 90,408,000 to 147,848,000, and phosphate shipments from 168,788 tons to 296,203 tons. From 32,070 tons of freight shipped through Hillsboro Bay and river in 1898 the amount grew to 96,029 tons in 1900.

And these were but the beginnings—mere hints of what Tampa would do once its advantages became generally known to the world of trade. The increase in population was from 720 in 1880 to 5532 in 1890, 15,839 in 1900, and 38,524 in 1910. The following table of receipts by Government departments will show something of the growth in imports, cigar manufacturing and post-office business:

Year.	Internal Revenue.	Customs Receipts.	Postoffice Receipts.
1897.....	\$280,205 00	\$638,515 00	\$27,282 00
1898.....	331,079 00	352,336 00	41,311 00
1899.....	441,343 00	530,128 00	31,357 00
1900.....	496,560 00	871,377 00	33,900 00
1901.....	498,110 00	865,409 00	36,332 00
1902.....	442,751 00	1,250,984 00	40,296 00
1903.....	500,066 00	1,318,531 00	47,597 00
1904.....	596,212 00	1,051,189 00	60,267 00
1905.....	689,124 00	1,604,826 00	74,362 00
1906.....	851,450 00	1,764,647 00	64,336 00
1907.....	865,316 00	1,687,609 00	114,631 00
1908.....	731,048 00	1,581,390 00	119,512 00
1909.....	801,578 00	1,891,836 00	138,474 00
1910.....	638,535 00	1,377,262 00	169,106 00
1911.....	910,439 00	2,292,472 00	173,024 00

The percentages of these increases are as follows:

	Per cent. increase 1911 over 1910.	Per cent. increase for past 10 years.
Internal Revenue.....	42	103
Customs Receipts.....	67	359
Postoffice Receipts.....	2.4	380
Cigars Shipped.....	46	99
Phosphate Movement.....	11	282
Building	20	575
Tonnage—Hillsborough Bay.....	51	1160

The following table shows the yearly increase in tonnage through Hillsboro Bay and Hillsboro River:

Year.	Tons.	Year.	Tons.
1898.....	32,070	1905.....	295,422
1899.....	87,740	1906.....	432,981
1900.....	96,029	1907.....	531,462
1901.....	131,208	1908.....	676,312
1902.....	169,844	1909.....	821,279
1903.....	228,252	1910.....	1,098,071
1904.....	274,394	1911.....	1,650,000

The lumber moving through the port of Tampa during the year 1911 totaled 46,169,690 feet, of which 31,042,750 feet went coastwise and 15,126,940 feet went to export. The railroad cross-ties passing through the port were 253,000 pieces. The rosin exported reached 97,032 barrels and the turpentine 545,956 gallons.

The Spanish cedar imported for cigar boxes in one year totaled 761,096 feet of sawed and 1,815,092 feet in the log. From the coal fields north of Hatteras came 36,096 tons of coal, and numerous cargoes of oil in bulk and refined oil and gasoline were brought in from the Texas fields. There were many tons of tropical fruits from Central America and the West Indies passing through for consumption in the Southern States; much food and many wines came in from Spain, general merchandise from many points north and west, and thousands of tons of salt, kainit and potash from European ports were landed at Tampa.

As a port of entry Tampa stands seventh in importance in the United States according to the annual report of Daniel J. O'Keefe, United States Commissioner-General of Immigration. The list is as follows: New York,

Boston, Philadelphia, Baltimore, Portland, Maine; San Francisco, Tampa. This report shows Tampa ahead of New Orleans and Galveston.

The 1021 vessels doing business in and out of Tampa during the year 1911 possessed a total tonnage, net register, of 1,469,317 tons. They comprised 704 steamships, 273 schooners, 15 barkentines, 8 barks, 21 seagoing tugs and barges. The hundreds of local coasters and deep-sea fishing craft plying about Tampa are not embraced in this count.

It is interesting to note the manner in which the Government has done its work with respect to the port of Tampa. The improvement of the channel leading up to the city was begun in 1880, when money was appropriated to make a channel 9 feet deep at mean low water, 150 feet wide in the bay and 200 feet wide in Hillsboro River. In 1888 the depth was reduced to eight feet. The work under the 1880 appropriation was completed in 1893. A second plan was adopted in 1899, doubtless as a result of what had been learned from the Spanish-American War, and an appropriation was made to deepen the channel to 12 feet at mean low tide and cut it 150 feet wide in the bay and 200 feet wide in the river. This plan was carried out at a cost of \$275,000. A third plan, adopted in 1905, called for a depth of 20 feet at mean low tide and a turning basin 450 feet wide and 1050 feet long at a cost of \$448,350. This plan was carried out, except that the channel in one part of the turning basin was only 16.8 feet deep. The next plan was for a channel 24 feet deep, and that has been executed, so that vessels of that draft can now come to the Tampa wharves.

These changes of plans, increases of appropriations, deepening of the channel and enlargings of the basin have not been made any too soon, for each time the commerce carried on has overgrown the facilities furnished and demanded more. As this article is written the owners and officers of the ships doing business in and out of the port of Tampa complain of lack of room, and the demand is now for a channel 30 feet deep and much wider than the present one.

and cultivation; sugar cane produces heavily and contains a large percentage of sucrose. There is scarcely any crop that can be grown profitably anywhere that will not yield as well or better in the section of Florida immediately tributary to Tampa, and Tampa, the metropolis of that section, its chief railroad center, its only important port, and its best local market, will naturally reap more and more benefit from the ever-increasing amount of its soil products.

The amount of phosphate rock now being shipped through Tampa is small in comparison to what it will be as the years go by, as lands increase in value, as the market for soil products grows, as the world's economy demands more production to the acre of land under cultivation and more in proportion to the man-power engaged in working it.

Tampa is today the largest manufacturer of clear Havana cigars, turning out annually almost 300,000,000 of them. Thousands of people find employment in the many cigar factories of the city, and the payroll runs in that industry alone about \$250,000 a week. But while cigar-making is the city's leading industry, it is by no means its only one, for Tampa has learned that diversified industries are more dependably profitable and long ago began to give attention to other enterprises. Among the many manufacturing plants now doing business in the city the following may be mentioned:

Large iron and machine works, building dredges, cranes and derricks of great power; shipbuilding works, gasoline lamp factory, trunk factory, carriage and wagon and harness factories, broom factories, automobile tire works, awning works and tent factory, palmetto brush factory, bottling works, boiler works and iron foundries, woodworking establishments, cement works, making tile, brick and blocks; cider and vinegar works, extract bottlers, coffee roasters and mills, confectioners, wholesale bakers, wholesale ice cream factory, printing, bookbinding, cooperage works, cigar-box factories, cornice works, cratematerial factory, manufacturing jewelers, soap factory, two fertilizer factories, patent-medicine factories, furniture-makers, makers of heaters and ventilators, steam laundries, marble and granite works, office fixtures, planing mills,



COASTWISE HARBOR, TAMPA, FLA.

Of all United States ports having adequate railroad facilities for handling a large amount of traffic Tampa lies nearest the eastern end of that canal, and will, as a matter of course, be the one through which the largest amount of trade coming from that source will be distributed and the one in which the largest amount of commerce directed to those countries will be concentrated for shipment. A glance at the appended table showing the distance of important ports from Colon must carry conviction of that fact:

Ports.	Miles.	Ports.	Miles.
New York.....	1,963	Galveston.....	1,496
Philadelphia.....	1,938	Mobile.....	1,358
Baltimore.....	1,902	New Orleans.....	1,392
Savannah.....	1,568	Pensacola.....	1,340
Charleston.....	1,563	Tampa.....	1,216

With the completion of the dredging necessary to carry through the plans worked out by the Government engineers Tampa will have a land-locked harbor where the vessels of the world can ride in safety, no matter how high the seas may pile outside the bar, where the rise and fall of the tide is scant 18 inches and where there will be ample depth to carry the deepest draft vessels afloat.

One of the most important features in connection with the standing of Tampa as a port is the fact that its harbor is the freest in the United States, a larger percentage of its docks being controlled by the city than is the case anywhere else. The Government has too long spent public money to improve harbors where private parties owned the docks and took too deep a toll from commerce. It will be the policy hereafter to pay most attention to those harbors that are freest from selfish private control, and in this respect among harbors of importance Tampa stands unmatched.

Being more convenient to the eastern end of the Panama Canal than any other port likely to prove a contender for the business coming thence, Tampa is also nearer Washington than any dangerous rival, being but 1004 miles, while New Orleans, for instance, is 1118 miles. Being thus nearer to the canal and nearer to the seat of government than any other, it seems to be one of the certainties of the future that Tampa will be made the port of passage for Government business between the capital and the canal.

Tampa is backed up by a country in which soil and climate join to make the garden spot of the continent. Not only in citrus fruits, in vegetables and other things regarded as belonging to a subtropical country, but in the ability to produce staple crops as well it is unsurpassed. Cotton yields abundantly wherever given the proper attention; corn has been known to bring forth a hundred bushels to the acre when subjected to scientific methods of planting

rubber stamps, sailmakers, shipyards, soft drinks, bottled mineral waters, clothing factories, brewery, liquor-bottling works, many steam woodyards.

It is estimated that there are 18,000 people employed in the various industrial concerns in Tampa, and that the weekly payroll reaches \$400,000.

Tampa now does a wholesale business aggregating \$30,000,000 a year, and yet there is room for jobbing houses of many kinds. The expanding needs of the country tributary to the city, and the great countries to be opened up to the enterprising merchants who are first on the ground by the completion of the Panama Canal, render Tampa a most promising location for jobbers in many lines, and the opportunities will no doubt be soon taken advantage of.

As a place of residence Tampa offers many attractions, first among them being its delightful climate, that is, neither cold in winter nor hot in summer. While the people throughout the North were sweltering and falling exhausted from the effects of the terrific heat of the summer of 1911 those in Tampa were comfortable, the mercury at no time registering more than 96° and rarely reaching above 92°.

Tampa is a city of homes, and probably in no place of the same size in all the country do more people own the houses in which they live. This tells better than can be told in words the story of the people's thrift. There are many very handsome homes, and the average is far above the average of most cities. Strangers are universally received hospitably and made to feel at home.

The public school system, than which there is none better in the country, is augmented by a number of private educational institutions, and the youth of the city are given every opportunity to acquire such education as their inclination prompts and their chosen callings in life demand.

In the matter of churches all the leading denominations are represented, and some of the houses of worship are of the handsomest and most attractive style of architecture. The church membership is large, a fact that finds reflection in the high moral tone that pervades the entire community.

The health of Tampa is shown by the figures to be far better than that of the average city, and there is probably no other city in the country of the same size that has among its citizens so many hale and strong men and women of greatly advanced age. There are many persons there whose age is more than fourscore, and not a few who have passed the century mark.

To sum up, then: For a successful business life, for a pleasant social life, for a long and happy life, Tampa offers inducements equaled by few places and surpassed by none.

The secretary of the Board of Trade of Tampa will send on request, without charge, a 36-page, 8x12-inch fully illustrated book, worthy a place in any library or on any library table.

Tarpon Springs, Florida, Queen of the Pinellas Peninsula



AMID bays and bayous, lakes and lagoons, and with the Gulf of Mexico but a few hundred yards away, Tarpon Springs, situated on ground that rises high above the water, dominates a scene of beauty and fascination not surpassed anywhere in the land of enchantment known as Florida. Lying some twenty-seven miles northwest of Tampa, on what is widely known and as widely famed as the "Pinellas Peninsula," Tarpon Springs presents an aggregation of advantages and attractions to investors and homeseekers that cannot be duplicated elsewhere.

The soil of the surrounding country is especially adapted to the production of citrus fruits; the climate is of the soft, wholesome kind that ripens them to perfection, and the combination of both has given the oranges and grapefruit of the Tarpon Springs section a character that puts them at the top of the market for general excellence. No weather sufficiently cold to kill trees has ever been known on the Pinellas Peninsula as far back as the meteorological records have been kept, and there are many orange groves, the trees in which tower thirty or forty feet high, and present great spreads of fruit-bearing surface not found in other less favored regions. This accounts for the fact that the trees in this section of Florida average twice the yield of fruit that marks the general average for the entire State. Groves of thirty-five, forty, or even fifty years of age, are still bearing, and the trees look as healthy and vigorous as any to be encountered at any age.

Pears and peaches also make good crops in the Tarpon Springs section, the latter fruit especially having been found to yield profitably at a very early age. These peaches, ripening in early spring, reach the market at a season when they are a much sought luxury, and bring good prices as a consequence.

Other fruits that flourish in the same section are the avocado, the guava, lemons, tangerines, mangoes, bananas, grapes, Japanese persimmons, plums, and kumquats, now coming into great popularity.

This soil is also well adapted to the growth of many varieties of vegetables, and fine profit is being reaped by the truck gardeners who apply intelligence and industry to the business of supplying Northern markets with early vegetables. Tomatoes, celery, lettuce, peas, beans, Irish potatoes, sweet potatoes, radishes, cabbage, cauliflower, beets, Bermuda onions, peppers, canteloupes, watermelons, cucumbers—in short, practically all the vegetables known to the kitchen garden of any section are here produced in abundance, together with some varieties little known to other localities.

Of field crops there is a very large variety that have been found to produce well in the Tarpon Springs section. Corn yields profitably, oats abundantly, and sugar cane to an amount that insures from 300 to 400 gallons of syrup to the acre. This, in fact, is one of the most profitable crops that can be grown, for it needs little care after planting, never fails, and grows at a season of the year when there is little doing in other crops. Japanese cane is one of the best forage crops known, and the yield per acre is very large wherever planted in the section under consideration. It makes excellent silage, and in that condition is highly relished by stock. The cassava is another valuable forage crop that flourishes in the country about Tarpon Springs. It is ground into meal for bread or starch, is a fine food for cattle, hogs and chickens, and in the form of starch will pay from \$300 per acre up, according to the market. The soil is well adapted also to the production of peanuts, which yield 40 to 50 bushels of pods and two tons of straw to the acre. This is a fine feed for hogs, a favorite manner of handling being to turn the animals into the field and let them root up their own subsistence. It has been found a most profitable way of preparing porkers for the market.

In addition to growing fruits or vegetables, or both, energetic farmers of the Tarpon Springs country have found they can make "easy money" by raising poultry. The three counties of Pinellas, Hillsboro and Pasco are known to produce more eggs per hen per annum than any other section of the country, an advantage that will be readily recognized by the poulturer. The reason is, of course, the long laying season, for the hen here is not stopped by either cold or heat, and can keep at work throughout the entire year. Chickens and turkeys, ducks and geese, all these flourish to the fullest extent about Tarpon Springs. The many lakes and other bodies of water abounding make it the ideal section for raising ducks and geese, for it is easy for the purchaser of a farm to secure one that will give him a lake in his yard.

The soil is a rich sandy loam of from two to five feet in depth, underlaid with heavy clay subsoil and low-grade phosphate, thus forming an unsurpassed combination for productiveness. The contour of the country is high and rolling, and this, with the porousness of the soil, forms perfect drainage and irrigation conditions, for the water sinks from the surface to the clay at the basis of the soil, thence to be drawn as needed by the plants through the myriad roots they send down into it. Water in unfailing abundance and absolute purity can be secured by wells driven from 50 to 150 feet depth at any point that may be desired.

So much for the country surrounding Tarpon Springs and which forms the basis for much of its prosperity.

As for the city itself, it is almost ideal in its loveliness and enjoys conditions that render it almost as ideal from a practical business point of view, conditions some of which have been grasped by enterprising hands and are being wielded for the creation of numerous private fortunes and the general upbuilding of the municipality.

First in importance among business enterprises is the sponge industry that has been built up here, and which has made Tarpon Springs the leading

sponge market of the world. The sponges are secured from the bottom of the Gulf along the western coast of Florida by divers who go down in diving suits and helmets that enable them to stay under water for a considerable time and to secure the sponges much more easily and rapidly than can be done by the old method of dragging them up by a hook on the end of a long pole. Sponges can also be secured by this method from much greater depths. The sponge business is carried on principally by Greeks, a large number of whom make their homes in Tarpon Springs, where they are found to be for the most part industrious, agreeable, progressive, law-abiding citizens. More than 2000 men and more than 200 boats are employed in the sponge business, and the sponges brought to the Tarpon Springs exchange for sale bring about a million dollars a year.

The great numbers of boats employed in the sponge business, in addition to those plying the waters in general business, have caused the establishment of a boat-building industry that gives employment to many more men. These are for the most part Greek ship carpenters, who make good wages and lend important help in making the city prosperous and progressive.

Other important industries are general fishing, which is carried on to a large extent; two sawmills, with machinery for making finishings for buildings; two large dairies, which furnish the city with its supply of milk and butter; an ice factory that supplies the local demand with the ice made from the purest water, and a large number of smaller plants, each of which performs an important part in the life of the community.

The city is well lighted by electricity, has more miles of sidewalks than any other city of like size in the State; has a long stretch of paved streets, a good sewerage system, a water system owned by the municipality, which furnishes an abundance of pure water from artesian wells; a telephone system that brings it into communication with outside towns and links its citizens together locally as well; a municipal government administered by leading citizens and business men who keep always in mind the right of the people to be properly governed, and are ready at all times to aid in furthering any enterprise designed for the public good; a good weekly newspaper and a Board of Trade that labors incessantly for the good of the town and the people.

Two banks, carrying large deposits, by their liberal course conserve the interests of the community and their stockholders and depositors by lending all possible aid to safe and proper business enterprises, and have done much to aid in the upbuilding of the city. The mercantile establishments are numerous, and the stocks of goods carried would do credit to cities of much greater population.

One great need of Tarpon Springs at the present time is one or more large hotels. It has but two hotels, both small, and there is constant demand for many times the accommodations they can furnish. Some of the best private homes open their doors at times for the accommodation of tourists and winter visitors, who refuse to take no for an answer to applications for board, but there is a large and constantly increasing demand for such accommodations that the city is totally unprepared to fill. No other place in Florida offers so attractive an opportunity for profitable investment in hotel property.

Tarpon Springs has excellent railroad connections. The Atlantic Coast Line gives it ample facilities for reaching all points north, running a through line of sleepers and parlor cars to and from Jacksonville, while the Tampa & Gulf Coast Railroad runs direct to Tampa and furnishes further desirable connections there. It has a good harbor and excellent facilities for water transportation.

A fine public road extends from Tarpon Springs southeast to Tampa and south to Clearwater and St. Petersburg, and scores of automobiles may be seen daily carrying their many passengers on business or pleasure bent. The twenty-seven miles between Tarpon Springs and Tampa is easily and frequently negotiated in less than an hour's time.

Tarpon Springs has public schools that rank with the best in the country, and at Sutherland, a few miles south, is a preparatory school belonging to the Methodist Church that carries pupils far along the road that leads to liberal education. Many young people from the city attend the daily sessions of that school, going to and fro on the trains of the Atlantic Coast Line road.

The religious life of the city finds representation in numerous churches, practically all the leading denominations having organizations there—the Catholic, Methodist, Episcopal, Presbyterian, Universalist and Greek have handsome church edifices. There are several churches for colored people also.

There are many very handsome private residences along the waterfront and in other popular portions of the city, and many sites have been purchased by those designing to build in the near future. No city anywhere presents more attractions for a place of residence, either because of natural beauty, or of dwellings and grounds artistically built and beautified.

The great Tarpon Springs, from which the city takes its name, gush out from the ground in the center of the city with a never-falling flow of water of high medicinal virtue, and a short distance away the famous "Wall Springs" furnish baths that have proved efficacious in the treatment of various diseases.

The climate is delightful at all seasons—neither very hot in summer nor very cold in winter. It is a climate peculiarly adapted to affording relief to those who suffer from chronic bronchitis, catarrhal affections and kindred diseases.

From the standpoint of either wealth, health, physical comfort or social environment, Tarpon Springs presents manifold attractions equaled by few, surpassed by none.

Clearwater, Florida—A Beautiful City On a Beautiful Bay



CLEARWATER, the county-seat of the new county of Pinellas, is in many respects the most attractive little municipality to be seen in the whole State of Florida. From a bluff that rises sheer thirty feet from the surface of Clearwater Bay it looks out over that beautiful sheet of water into the open Gulf, from whose winds and waves it is protected by a narrow line of islands extending for a number of miles up and down the Gulf Coast, only a short two miles out from the mainland.

The town has a population of about 1500 and is rapidly growing. It has a complete sewerage system and adequate water and electric-light plants, the latter of which belongs to the municipality, and which, instead of being a burden upon the public purse, furnishes water at a moderate price and returns a profit sufficient to care for the interest on and create a sinking fund to pay off the indebtedness incurred for its building. It may be remarked in this connection that the water furnished is of the purest and most palatable kind, being secured from a number of wells drilled to the depth of about six hundred feet.

Clearwater's prosperity is, of course, founded largely upon the fruit and vegetable business. For the production of large quantities of citrus fruits, the Pinellas Peninsula stands unrivaled in all Florida. The orange and grapefruit trees grow more thriftily, bear longer and produce more fruit to the tree than anywhere else in the State. The average production of orange trees in the State is less than two boxes per tree; in Pinellas county it is four boxes to the tree. The flavor of the Pinellas fruit is unsurpassed—indeed, many persons declare it unequalled—by that produced anywhere else. Be that as it may, the fact is indisputable that it is most popular where best known, and that it commands the highest market price wherever sold. The fact that there are many groves to be seen on the Peninsula, the trees in which are thirty-five years of age and upward, proves beyond cavil that they were not killed by the big freeze of 1895, which played such havoc with those of points farther north. In fact, no trees have ever been killed by cold weather on the Pinellas Peninsula within the memory of the oldest citizen or within the scope of the most ancient record of Florida fruit-growing. From the station of Clearwater there were shipped during the year 1911, 100,000 boxes of citrus fruits gathered from the groves in that immediate vicinity.

In the matter of trucking, the lands about Clearwater stand as high in productivity as any in the State. They are for the most part of a rich sandy loam, with a good clay subsoil, easily worked and requiring less fertilization than most Florida lands. They produce abundantly of tomatoes, Irish potatoes, sweet potatoes, cabbage, cauliflower, beans, celery, lettuce—in fact, all the vegetables that can be grown anywhere in Florida can be produced in the country tributary to Clearwater.

In addition to these, corn, sugar cane and Japanese cane bring forth abundant crops wherever given the opportunity.

The shipping facilities at Clearwater are excellent. The Atlantic Coast Line Railway connects the town with all the principal cities of the country, and the markets can be reached as quickly and as cheaply from Clearwater as from any other of the towns on the west coast of Florida, and much more quickly than from some. Clearwater also has the advantage of competitive transportation by water. A channel is now being deepened between Clearwater and Tampa, which will furnish passageway for boats between the two places and will thus give Clearwater the advantage of direct connection with the greatest exporting port on the Gulf Coast. This channel is almost completed and a line of boats between the two cities will unquestionably be established in the near future.

While the attention of the people has been directed generally toward fruit-growing and trucking rather than to manufacturing enterprises, there is no question that Clearwater offers excellent inducements for various kinds of manufactures. The immense wooded districts lying within easy reach—great forests of pine and cypress being seen on all sides—make it one of the best points in the State for woodworking plants of the kind that secure their raw material from such forests, while by the railroads and water transportation the city is insured cheap and reliable connection between it and the markets of the world.

One concern is already doing a large and lucrative business in the manufacture of lumber. It operates a sawmill and a factory for making boxes, crates and baskets such as are used in shipping fruits and vegetables, and has a demand for all it can turn out. Indeed, the demand for building material has become so great that the sawing capacity of the mill is being enlarged, a planing mill added and machinery put in for making window and door frames, flooring and general inside finishings.

The waters of the Gulf of Mexico just beyond the chain of islands that cut off Clearwater Bay abound in fish of many kinds, and a very important business is done in catching and shipping to the markets of the North those varieties that are popular, such as mullets, Spanish mackerel, sea bass and trout. Two big fish houses handle the fish brought into Clearwater, and their aggregate shipments are many hundred tons a year. They give employment to many men, all of those among whom who are industrious make good wages. As showing the immense schools in which these fish run in these southern waters, it may be stated as a fact easily demonstrable that as many

as 60,000 pounds have been caught at a time in one net. These fish are packed in cars—a layer of ice, then a layer of fish, and so on until the cars are filled, and in this way it goes to the markets. This does away with the trouble and expense of packing in barrels.

An ice plant of large capacity is one of the important manufacturing enterprises of the town, and lends its aid to the fish and vegetable shipping industries.

In general business Clearwater stands high among the most progressive cities of its size in the country. It has numerous stores, some of which are exceptionally large and well stocked, and in quality of goods and management are abreast with those in places of greatly more population. Two banks pursuing popular careers show something of the volume of business done in the town and the amount of business money used in conducting it. Of these the Bank of Clearwater, with a capital of \$50,000, has deposits of about \$300,000. The People's Bank of Clearwater has a capital of \$36,000 and deposits of about \$150,000.

Clearwater has for years been a most popular winter resort for those who wish to escape the rigors of the weather in their Northern homes, and thousands have gone there to enjoy the mild air that prevails in the winter months. The great Belleview Hotel, built some fifteen years ago by the late H. B. Plant, and but recently added to by the present management, entertains each winter many guests from various sections of the country, while the Verona Inn, the Phoenix Hotel and other smaller hotels and boarding-houses entertain many more. But even with the great hotel capacity Clearwater now has, it cannot provide for all those who express the desire to spend the winter months there, and there is an excellent opening for one or more hotels of large capacity. The boating and fishing afforded by bay and Gulf, the large amount of game in the woods, easily reached by those disposed to hunt, unexcelled golf links, numerous tennis courts, and all the pleasures of automobiling on excellent roads and of riding and driving good horses through scenes of unsurpassed beauty, combine to make Clearwater as attractive to those who need rest and recreation and escape from severe cold in winter as any spot anywhere on earth. To double the hotel capacity would mean to double the number of winter visitors.

As a place of residence Clearwater offers attractions equaled by few places, by none surpassed. Its high position, its beautiful bay front, with the broad sweep of the Gulf in easy view; its many handsome residences stretching along the shore farther than the eye can reach—these present a picture that captivates the eye and entrances the mind. Some of these homes—a majority, in fact of those on the bay front—are beautiful, costly and elegant. They belong for the most part to men who have accumulated fortunes, and who have there builded homes to which they can turn from the stress of business to find rest and recreation amid pure, health-giving air, and surroundings whose enchantments bring forgetfulness of trouble met in the fierce encounters of active life. Most of these bay-front homes have their private docks and bathing pavilions, and the owners live there for a few months every year a life of idyllic repose.

Clearwater has excellent educational advantages. The public school system includes the full complement of grammar grades and a high school that carries the pupil along through a course of instruction calculated to prepare him for any walk in life demanding anything short of the educational finish conferred only by colleges of high class. The school buildings are fine specimens of modern architecture, and are highly ornamental, as well as comfortable and conveniently arranged.

There are a number of churches with handsome edifices, and the character of the people is distinctly moral and religious, as is evidenced by the large attendance at church services, and no less by the good order of the community and the honorable dealings that characterize business transactions between the citizens.

The lands about Clearwater are much cheaper than in other parts of the State offering the same varied opportunities, and are greatly superior to most of them in fertility and point of location. The country in the Clearwater section is high and rolling, with perfect natural drainage and a subsoil that holds the water against the day of possible drought, so that there is a never-failing supply of moisture at the roots of the plants, no matter what their nature may be. This insures good crops in all seasons.

Water for domestic use is obtainable through the medium of wells driven a few hundred feet to a never-failing supply that is absolutely pure.

In a social way the city of Clearwater is possessed of many attractions. Its citizenship is composed to a large extent of people of the leisure class, whose opportunities for travel and study have been utilized to an extent that makes acquaintance with them of a highly educational nature, and an air of camaraderie and good fellowship pervades the entire community that renders residence there delightful in the extreme.

The fact that Clearwater has been chosen as the county-seat of the recently formed county of Pinellas means that it will be made the home of a highly educated and intellectual class of people—that it will be the intellectual center of a wide scope of country, thus adding to the many other attractive features it presents as the place in which to build a home and rear a family.

The Highland Farms of Pasco in the Hill Region of Florida

A Beautiful Section of a Beautiful Country

THE Highland Farms of Pasco County" is the attractive name given a large area of land lying near Dade City, Florida, which has been subdivided and is being offered to homeseekers and investors by the Tampa Bay Land Company of Tampa and Jacksonville. Nor is the name any more attractive than the property which it describes, for its high and rolling character gives it a peculiar charm for those who do not like the monotony of a continuous dead-level. Almost the entire body of land is higher than the surrounding country, and some of it raises to an altitude of from 200 to 250 feet above sea level. It is divided into three classes of lands—high pine lands, low pine lands and hammock lands. Of these, the dark, rich soil of the hammock lands is best adapted to trucking and the growing of field crops, but both classes of pine lands are excellent for the production of citrus fruits, and some of the finest specimens of oranges and grapefruit to be seen in Florida come from these lands.

Surrounded by the Highland Farms' tract, and of the same general character, is what many persons declare is the finest grove of oranges and grape fruit trees in Florida. It is about a mile from Blanton, a small town on the Atlantic Coast Line Railroad, and is known as "Jessamine Gardens." The grove lies on a north hillside, extending from the top of the rise to a beautiful lake at the bottom, and contains about 12 acres. The varieties of oranges grown include about all the most popular kinds known to the State, and it can be said without injustice to any other grove or any other section that nowhere have any of the numerous varieties been brought to a higher state of perfection. The fruit grows large, ripens beautifully and has the most delightful flavor. The grape fruit also is of the highest grade, and brings the highest price in the market. Tangerines are produced here that are as large as ordinary oranges, and of the most delicate and delicious flavor. This grove has, of course, received the most intelligent care and cultivation, but even so, it but illustrates what the same care and cultivation can do elsewhere under like conditions of soil and climate, and these abound on every hand on the lands known as "The Highland Farms of Pasco County."

Adding greatly to the charm of the high, rolling country are numerous lakes that dot the landscape, their clear waters, down to which the ground slopes by gentle incline, giving a mirror-like effect to the various scenes. The waters of these lakes are clear and pure, and afford homes for fish of many kinds that the inhabitants of the surrounding country catch in great numbers. In winter they form feeding grounds for thousands of ducks, so that those living nearby have the best hunting right at hand.

IRRIGATION POSSIBILITIES.

One of the most picturesque scenes, indeed in the whole State of Florida is "Mirror Lake," a sheet of water of crystalline clearness and purity lying on the summit of one of the hills within this boundary of land, though belonging to another owner. This lake, fed by never-failing springs at its bottom, overflows at seasons and sends a sparkling current through a channel down the hillside. Near the top of another hill a very large spring gushes from the ground in so large a stream as to suggest the formation of a large reservoir for household and irrigation purposes for the future residents on nearby lands.

The soil is generally a light sandy loam with a subsoil of clay, and is adapted to the production of all kinds of crops grown in the South and all those produced in the North except wheat. The lands produce largely of such truck crops as Irish potatoes, sweet potatoes, beans, cucumbers, tomatoes, cauliflower, cabbage and strawberries, and in addition to citrus fruits bring forth abundantly of pears and peaches. The rolling character of the land provides perfect natural drainage, while plenty of water for such irrigation as may be desired can be secured from wells cheaply driven to a depth of from 20 to 60 feet. The water procured from such wells is free, pure and delightful for drinking and all domestic purposes.

ONE FARMER'S EXPERIENCE.

It would be practically impossible to better sum up the advantages of this section for all purposes than has been done by Mr. Eli T. Vaughan, one of the prosperous farmers of Pasco, who writes of his own experience as follows:

"I moved here 30 years ago from Iowa. I have 140 acres in my place—12 acres in orange grove and nursery. I do general farming, and can raise any farm product profitably. I produce corn to the value of \$20 per acre. The beggar weed and crab grass follow the corn crop voluntarily, and produce an average of two tons to the acre of the finest kind of hay, that is easily worth \$18 per ton. Peanuts I plant to fatten hogs. I turn the hogs into the fields, and can fatten 15 head to the acre. I have one-seventh of an acre in kumquats that make an average profit of \$150 per annum. One year this little patch netted \$250. I plant Japanese cane for fodder. Can cut it every two or three months and never have to replant. Sweet potatoes produce profitably. Poultry does fine; always a good demand for chickens and eggs at a fancy price. This is the best climate in the entire world."

Similar testimonials have been written by practically all of the farmers of the region around about.

The health of this section is equal to that of any other anywhere, no specific diseases prevail, the heat is not excessive and sunstrokes are unknown. There

are no extremely high winds, and uprooted trees are rare. There is very little fog, few frosts, and those few, coming in December and January, are generally of the lightest kind. The cost of clearing the land is from \$20 to \$40 an acre, and fencing costs about \$175 for a 40-acre tract. Lumber can be bought at nearby mills for from \$18 to \$28 per thousand feet; labor is comparatively cheap, and houses and all other structures can be built at small cost.

A PROSPEROUS COMMUNITY.

The Highland Farms tract is surrounded by five or six prosperous towns—Dade City, county-seat of Pasco county, with 1500 people; San Antonio, with 400; St. Leo, a Catholic community, where excellent schools are located; Trilby, a railroad center with about 400 people; Laccochee, a small village eight miles northeast of Dade City, and one or two others of smaller size and less importance. These towns and villages and rural communities are the homes of people of education and refinement, who have built good houses, established excellent schools, and have brought with them into this new country the same religious and moral atmosphere with which they were surrounded in their native places. They are progressive, well to do, neighborly and helpful, always willing to assist by experienced counsel and advice those who are new to the soil and its needs. They have succeeded, and they are glad to see others succeed and willing to lend a hand in bringing about their success. In short, there is no country in which newcomers find readier welcome or more hospitable treatment, or are made to feel more immediately at home.

Three lines of railroad traverse the Highland Farms of Pasco, furnishing transportation facilities equaled by few farming sections and surpassed by none. The city of Tampa, one of the leading municipalities of Florida, is but an hour and a half away by rail, giving the producers of this section the best local market in the State for all they can raise. The steamship lines running from Tampa's wharves bring them in touch also with all the important ports of the world.

What more could any man wish in the country in which he seeks to make his home and rear his family—what more could he find in any country—than fertile lands in a climate that is warm enough to bring forth tropical fruits and cool enough to be delightful at all seasons of the year; lands of such rolling character that they have perfect natural drainage; home sites in the forming of which Nature seems to have specially exerted herself to please the eye and enchant the mind; neighbors of liberal and enlightened minds, kind, generous and hospitable; transportation facilities that bring the markets of the world to the door-yard; farms that can be bought cheaply and paid for on terms that appeal to the leanest pocketbook; pure water in plenty, good roads, and every requisite for good health, churches, schools—what more is there to wish or to expect to find?

OFFICIAL OPENING.

The date of the official opening of the lands to settlers has been fixed as Friday, March 8, and hundreds of people from all parts of the United States are expected in Dade City on this occasion. In Dade City this is regarded as a great public event, and the civic pride of the people is aroused as never before. At an enthusiastic meeting of the Board of Trade and the city officials, the Mayor of the city and the president of the Board of Trade jointly issued a national invitation for this occasion, and committees have been appointed to provide entertainment for all visitors. Every person expecting to be present at the opening of this famous Florida Highlands should immediately write to the Dade City Board of Trade to that effect.

These lands are offered for sale in 40-acre units, and the opening price is uniform at \$30 per acre, the choice locations going to those who purchase first. The terms are \$5 per acre down at the time of purchase and 50 cents per acre per month until the balance is paid, deferred payments to bear no interest and the purchaser not required to pay taxes until his payments are completed and his deed delivered. The first six months' payments will be suspended in the cases of those who immediately begin and continue substantial improvements.

The Tampa Bay Land Company, the fee-simple owner of these lands, is a domestic corporation, having been chartered under the laws of Florida some six years ago. It is the owner of Keystone Park, the original colony of Hillsboro county, and of South Tampa, the only city-suburban colony in Florida. It has the endorsement of the Tampa Board of Trade, the Dade City Board of Trade, the Tampa banks, the newspapers and thousands of satisfied customers who have dealt with it and who know it makes its every promise good. The history of the company forms an unbroken chain of successes and is a guarantee of the success of its present undertaking, a success that means not only the disposal of the property at the prices fixed, but its disposal to those who will, in turn, succeed, for the real success of any business concern is measured by the success of those who make up its list of patrons.

As one stands upon these heights and looks over the broad acres rolling away in every direction as far as the eye can reach, with long wooded stretches broken here and there by small areas of open land, with the smooth waters of beautiful lakes catching and reflecting back the rays of the Southern sun, it takes no prophetic eye to see the time when attractive homes, surrounded by lovely groves and productive gardens, will adorn the hillsides and vales, and an industrious, intelligent and progressive people will have found happiness and prosperity amid the Highland Farms of Pasco County.

The Wauchula Section

In Famous De Soto County, Florida



THE town of Wauchula, in De Soto county, is situated 71 miles south-east of Tampa, on the Atlantic Coast Line and near the Charlotte Harbor & Northern Railroad line. It is about 50 miles from the Gulf of Punta Gorda and Boca Grande, and the Peace River flows tranquilly along about a mile west. The land is level for the most part, but easily susceptible of drainage wherever needed, and with water in such easy reach that there are few seasons when crops suffer from the drouth. The soil is rich, and there is a good clay subsoil that renders it of the highest value for farming and fruit-growing purposes. In fact, De Soto county has a larger percentage of land available for fruit growing and trucking than any other county in Florida. As for the climate, there is no section more richly endowed, and it is a fact of easy substantiation that no orange or grapefruit trees in the county have ever been killed by cold weather.

A noticeable feature about the groves seen in the vicinity of Wauchula is the size of the trees, the great bearing surface they present, and the particularly thrifty, healthy color. There are trees now bearing here which are known to be from 35 to 50 years old and which are still healthy and strong and yielding good crops each year. The flavor of the De Soto fruits is well known, and the growers always receive the highest prices for their products.

There are numerous trucking operations in the Wauchula section, and those who are conducting them are doing so with satisfactory profit. In fact, no man who has come here and worked with industry and intelligence in the trucking or fruit-growing business has ever been known to fail, and numbers of them have in a few years amassed competencies. The vegetables most generally grown are tomatoes, beans, English peas, sweet potatoes, Irish potatoes, celery, cabbage, lettuce and cucumbers. Watermelons make a fine crop, as do also Bermuda onions. Sugar cane yields largely, and is possessed of a high percentage of sucrose. A strong feature of the country is that the newcomer who wishes to engage in fruit growing can sustain his family by raising truck while his grove is maturing.

The trucking industry is comparatively in its infancy, but is growing rapidly, and promises in the next few years to make Wauchula one of the most important shipping points in interior Florida. In 1903 the total shipments of vegetables were less than 8000 crates; in 1911 they were more than 80,000; the amount of land being planted this year makes it certain that the aggregate of shipments will be almost double in 1912 what they were in 1911. This growth has all come about naturally, for there has been no colonization scheme utilized to bring in settlers and increase business. It is but an earnest of the greater growth to come in the near future, for the lands in the Wauchula section will stand close scrutinizing, and those who come to look usually remain to buy and build their homes and their fortunes.

The town of Wauchula is a rapidly-growing, thrifty municipality that has increased from 200 inhabitants in 1903 to 1500 at the present time, and that without a boom or any artificial aid. It has two banks, a number of stores of the kind that cater to the trade of such communities, and is altogether a fine example of a prosperous and progressive little city. The municipal government is in the hands of men who have the good of the community at heart and in mind all the time, and who give it an honest, progressive administration. They are making improvements along many lines, notably in laying pavements and putting out shade trees along the principal streets.

The public school is the pride of citizens and officials alike, and forms a most attractive feature for those seeking homes in which to rear families. The school buildings are large, commodious and of modern construction, and the teaching force is composed of those who are able, experienced and devoted to their calling.

There are three churches in the town that exert wide influence for the moral welfare of the citizens, and the community bears an excellent reputation for morality and good order. The Florida Advocate, owned and conducted by George Gooldsby, is a sprightly weekly newspaper that aids materially in making Wauchula known to the outside world.

The two banks mentioned above are run along lines as liberal as the rules of good banking will permit, and no worthy business man is allowed to want for financial aid that is proper to be extended. The oldest of these banks is that of the firm of Carlton & Carlton, which began business six years ago with a capital of \$15,000, and which on January 1, 1912, carried deposits amounting to \$169,000. The president of this bank is Albert Carlton; the cashier is C. J. Carlton. Both gentlemen are prominent in many other of the city's leading enterprises. The Bank of Wauchula began business four years ago with \$20,000 capital, and on January 1, 1912, its deposits were \$103,000. A. G. Smith, one of the most progressive of Wauchula's citizens, is president of this bank, and Jesse McEwin is cashier. Its stockholders comprise many of the leading business men of the town.

The chief industrial interest of the town at present centers about the operations of the Wauchula Land & Timber Co., which has a sawmill, two large crate, box and basket factories and a barrel factory. The two crate, box and basket plants are fitted up with all the latest and most improved machinery for manufacturing boxes, baskets, crates and hampers for the shipment of fruits and vegetables, and are run at top speed the year round to keep up with the orders for their output, which come from many sections of the State. Certain sizes of wood that are not available for other purposes are cut into staves and headings and sent to the barrel factory, which turns out annually from 35,000 to 40,000 fish and potato barrels. The economy of this company's operation is further shown by the fact that it owns and runs an ice plant, the fuel being furnished from the offal of the mill and factories. Not only that, but

such scraps as are not used under the boilers of these various plants are corded up and either sold to citizens of Wauchula for stove wood or shipped to the nearby phosphate factories for steam-making purposes. The limbs and useless timber in the woods are also cut into cordwood and sent to the phosphate works, where good prices are obtained.

The factories of this company give employment to some 225 men, while a force of 40 men is employed in the woods in furnishing logs, and about 25 are worked on the railroad owned and operated by the company in bringing in the logs. The mill, which now is a simple circular-saw mill used to cut lumber for the box and crate plants, will be enlarged soon to a double-deck mill of large capacity that will saw and manufacture lumber for the general trade. These plants have proven highly profitable so far, and will probably be more so as the demand for their product increases with the growth of the truck and fruit business.

The Wauchula Land & Timber Co. owns about 60,000 acres of timber lands in De Soto county, pronounced by experts to be the best timbered body of land of similar size in Southern Florida. Only about 8000 acres of this land has been cut over, the remaining being virgin to axe and saw. An estimate of the amount of timber standing on it places the figures at from 275,000,000 to 300,000,000 feet, and the company calculates that there is sufficient to keep its plants running at their present capacity for more than 20 years. The land runs in an almost solid body 9 miles one way and 20 miles the other, presenting excellent advantages for logging and delivery of timber. The company has built a railroad, known as the Wauchula, Atlantic & Gulf, from Wauchula, some eight miles west to the line of the Charlotte Harbor & Northern road. It is at present a private railroad, lying exclusively on the land of the company, but eventually will be operated as a common carrier, when it will become an important adjunct to the railroad facilities of Wauchula.

In addition to the big milling and manufacturing business carried on by this company, it has on its lands two large turpentine operations, which give employment to several hundred men and produce about 2000 barrels of spirits of turpentine and 6000 barrels of rosin annually. These operations are carried on about four years ahead of the milling business, that being the life of a turpentine tree.

Large phosphate deposits have been found on these lands, and in the nature of things it will not be long before big mining operations will be added to the other industries that are now helping to make the city and section among the most prosperous to be encountered in the State of Florida. A number of phosphate plants are working the deposits on lands almost immediately adjoining, thus helping to make the most important industry in Southern Florida; and as the deposits now under operation are worked out, and while the demand for their product grows, the deposits on this company's lands will become more and more valuable until they go far beyond the present value of land, timber and phosphate combined.

When the Wauchula Land & Timber Co. shall have finished its turpentine and manufacturing operations, and has laid off into farm lots of convenient acreage such of its lands as are not available for phosphate-mining purposes, it will have one of the most inviting fields in the State for a big colonization enterprise. Its boundaries embrace soil of the best type for agricultural purposes—strong, rich, fertile. The soil is adapted to the production of every kind of fruit or vegetable grown in Florida, and brings forth most of them in the greatest abundance and in their highest state of perfection. There is very little wet land that cannot be easily drained, and none so dry that water cannot be easily secured by driven wells. When these lands are opened up to sale and settlement, and when farms, groves and truck fields line either side of the railroad that will run through the tract from end to end the long way, it will make one of the richest and most prosperous sections of the State, and the town of Wauchula, the central business, manufacturing, banking and shipping point, will be one of the most prosperous of the State's many prosperous towns.

The officers of the Wauchula Land & Timber Co. are: Eugene Holtsinger, president; W. H. Tylee, treasurer; I. C. Smith, secretary. The directors are Ed Bostwick, Albert Carlton, C. J. Carlton, A. G. Smith, I. C. Smith, W. H. Tylee, Eugene Holtsinger, T. J. Youmans. These gentlemen are among the most progressive citizens of the various communities in which they reside, and are all firm believers in the future possibilities of the town of Wauchula and of the great agricultural section that surrounds it. They are conducting their great enterprises along the most liberal and progressive lines, recognizing the fact that what benefits and builds up the community at large benefits every member of that community and each interest therein, and are therefore found to be leaders in most of the plans and enterprises that are suggested and carried on for communal good. They are bent upon the development of their property along broad and comprehensive lines and upon the final establishment of an agricultural section that will not be surpassed by any of the splendidly prosperous sections in which the great State of Florida abounds.

Their property has many sites for homes that are ideally beautiful. It embraces numerous small lakes, in which fish abound and myriad ducks make their winter home; the woods are full of game, the forests are alive with birds, and the combination of attractions offered are of multiform variety. The people who are coming into the Wauchula section are for the most part educated, intelligent and possessed of sufficient means to enable them to buy land and build houses. They are erecting pretty homes and engaging in the kind of business that presents the most attractive features for rural residence. They and those who come to join them will make the Wauchula section into a vast succession of gardens, blossoming with beauty and fruiting with profit.

Key West, Florida

The Country's Municipal Outpost

THE advent of the Florida East Coast Railroad changed the entire chart of the future for Key West, and now, instead of being the victim of the necessity for rapid transportation in business, it is about to become one of its chief beneficiaries, and the rule that seemed to have worked its downfall will now prove a prime feature in its upbuilding. A glance at the map will show the powerfully strategic position Key West holds with respect to communication between the centers of population of the United States and the countries lying south—Cuba, the West Indies, Central and South America. From all these countries, and all the ports thereof, the United States port most easily reached—and through which the great cities and centers of population and of business in the country can be soonest reached—is the port of Key West.

Not only so, but when the Panama Canal shall have been completed, and when great steamship lines shall have been established between the ports of the Atlantic and the ports of the Pacific, it is through Key West that the hurried traveler must pass, both going and coming; through Key West the mails must go; through Key West the express and the lighter and more important freight must be sent, if advantage is to be taken of the quickest and most direct route between the chief commercial seats of this country and the various points to be reached by means of the great canal. Other cities may put forth their claims, urge the merits of their harbors and the railroad facilities with which they are supplemented, but the fact remains that ocean liners running between the canal and the great cities of New York, Philadelphia, Boston, Baltimore and Washington can steam into the harbor of Key West, discharge or take on such passengers, mails and express as may be necessary, and then, swinging back into the ocean roadstead, resume their onward voyages with the loss of so little time that it scarcely reaches into the realm of hours, and should be computed in minutes.

Vessels bound from the canal to other Gulf ports must pass so close to Key West that they can easily land at her piers and give their passengers the benefit of railway travel many hours before they reach the ports to which they are bound.

These are things which must prove of vast advantage to Key West. They mean, primarily, a large influx of men to meet the demand for labor about the docks, piers and railway terminals, and in their wake an added number of business men to take advantage of the increasing trade that is to be built up. They will mean many thousands of dollars to be gathered each year from the business of supplying ships and their passengers with the manifold articles they will, in the nature of things, demand. They will mean the establishment of a number of hotels for the care of those who are passing to and fro, and the greatly increased business such hotels bring to a city. These are the immediate results that will flow upon the completion of the "Over-Seas" Railroad and the steamship lines it will bring into the harbor, but these by no means form the full tale of those to come.

Key West affords inducements for certain industrial undertakings not equaled elsewhere, and with its newly-acquired railway connections, which render it more desirable as a place of residence than ever before, the alert eyes of enterprise, ever quick to perceive business opportunities, will be fixed upon it as never before.

Key West is a large manufacturer of high-grade cigars. Cubans coming to the island years ago began making cigars from tobacco imported from Cuba, and a very large business was thus established, the Key West cigar being sought by smokers everywhere because of its uniformly excellent quality. The proximity of Key West to Cuba, the home of the tobacco, and the similar conditions of climate as regards both temperature and moisture, render it the most eligible place for the manufacture of cigars of the highest grade. This business now employs thousands of workmen in that city, and creates a payroll that averages \$60,000 a week.

A cigar box factory, established a number of months ago, has pursued a career of great prosperity from the first in furnishing the boxes in which the output of the Key West cigar factories is packed. The advantage enjoyed by this and similar plants will be recognized when it is remembered that there is a big saving of freight that was formerly paid to bring the boxes from New York, whence they were practically all shipped, to supply the local demand.

Another manufacturing plant that has been in successful operation in Key West for a number of years is employed in making turtle soup and putting it up in cans for the market. The turtles are caught in the waters in the vicinity of Key West and taken there for butchering. The soup is made by experts, is pure and well cared for, and there is a demand for it greater than can be filled. The industry gives employment at present to a considerable number of persons in catching and butchering the turtles and making the soup, and is the means of taking quite a large amount of money to the island each year. It is thought that similar plants can be established, and can find plenty of material upon which to build a profitable business.

The waters about Key West abound in fish of all the favorite varieties, and there is no question but that a profitable business can be, and will be, built up in catching and shipping thousands of tons of them to the various markets of the world. At many other points on both ocean and Gulf coasts

large fish packing-houses have for years pursued successful business careers, and yet none of them occupies a position of equal advantage with that of Key West. It is believed that all this will be changed now that Key West has railroad transportation and can get fish into the markets on equal footing with those towns that have hitherto been more favored. The markets open to Key West fishermen have hitherto been only those of their own city and Havana, which has long been a buyer of their fish, but the railroad has changed all that, and now the markets of the whole country will be reached. The fish to be secured here embrace Spanish mackerel, which are found in schools that yield hundreds of tons; the red snapper, the kingfish, the grouper—in fact, all those that swim the Southern seas, and which are favorites with fish eaters everywhere.

The proximity of Key West to the great forests of South and Central America, with their wealth of high-grade woods, suggests it as a proper place for the establishment of woodworking plants of various kinds, designed to turn the products of those forests into the many manufactured articles for which they are so well adapted. On some of the neighboring keys also many handsome woods grow, and these, too, offer opportunity for manufacturing.

The incalculable tons of sea shells with which the islands in the vicinity of Key West abound suggest the establishment there of a factory for making buttons, and doubtless a plant of that kind will soon be at work there.

Key West presents excellent opportunities for wholesale and jobbing houses to do business with the countries to the south. Branches of concerns engaged in manufacturing agricultural machinery and agricultural implements of the kinds used in those countries will also find favorable locations there.

Among the plans projected by Henry M. Flagler, who built the Florida East Coast Railroad, is an ocean ferry upon whose boats unbroken trains will be carried from Key West to Havana, to go thence by rail over the island, thus allowing freight to be carried in unbroken bulk from all points in the United States to all points in Cuba reachable by rail. The completion of that plan will be of great moment in the industrial life of Key West.

The military authorities of the country are preparing to increase the number of soldiers kept in barracks there, and it will soon be made a 10-company post, with all the necessary accommodations for officers and men—hospital, commissary and quartermaster's stores, and the many other things that go with a first-class army post. The naval authorities, too, are making improvements in the naval station there, and it is expected that it will receive the treatment due it as a point of prime importance in the country's defense in time of war. In its deep harbor, under protection of the guns that frown from the portals of its great forts, the fleet of the nation would, without necessity for self-protection, be safe from the assaults of any force that could be sent against it.

A great tourist hotel is among the needs of Key West, and will probably be provided at an early day. It is believed that of all points in the State, none presents so many attractions to those of the North who wish to escape the rigors of a cold climate and spend the months of winter in the genial warmth of the South as does Key West. The glamor of novelty that has been cast over the city by its long period of isolation, no less than the aroma of romance that still clings to it as a heritage from the old aboriginal and piratical days, will prove a strongly attractive feature, and thousands will seek the opportunity to visit in comfort a city and an island which have appeared to their fancy as creations of the imagination. Then, too, the wonderful engineering achievement by which the "Over-Seas" railroad was built to the island will draw other thousands whose practical minds find delight in the contemplation of man's great accomplishments.

Two banks, with large deposits, care for the needs of the business community with as liberal hand as the rules of good banking will allow, and no worthy concern is allowed to suffer for want of funds.

The city has many mercantile establishments that in point of stocks carried and methods employed in meeting the wants of customers compare with those of cities of much more population, and there are few things necessary to the comfort and convenience of daily life that cannot be secured there.

Electric light and ice plants furnish those necessary adjuncts of modern life to Key West citizens, and a thoroughly up-to-date gas plant is in course of construction and will soon be sending its product into every part of the city. Electric street cars give excellent service between the principal points of the city.

The leading business men of the city have organized a Chamber of Commerce that keeps the good of the city always to the fore, and is doing a great work in calling the attention of the country at large to its manifold advantages.

The municipal government is in the hands of some of the most progressive citizens, and the administration of its affairs is given careful and intelligent attention.

While Key West lies so far south that summer weather prevails there throughout almost the entire year, yet the heat is rarely oppressive—never so much so as that of Northern points, where the mercury rises much higher, and where sun-strokes and heat exhaustion are common. The warmth of the sun at Key West is always tempered by a breeze blowing from ocean or gulf, hot nights are unknown and there is a buoyant quality in the atmosphere that renders it delightful at all seasons.

Key West is a good place in which to live, in which to enjoy life, in which to achieve success in business.

Corey—the Highest Type of Town Building

THE most modern and up-to-date city in the United States, built with special reference to providing homes for a great army of industrial workers and business people generally, is Corey, Ala. The greatest city in America cannot furnish better sanitary conditions through perfect sewerage and ample water supply, the highest class of road and street construction and electric illumination than Corey.

When the United States Steel Corporation through allied companies began the broad campaign of development work and the establishment of some new enterprises of vast magnitude in the Birmingham district, the building of a city to take care of the great increase of population which would naturally come through the operations of that company became a certainty. The character this city was to assume was not determined, however, until one of the most thorough investigations of the best city planning movements by experts, whose sole purpose was to provide a community where every possible convenience could be enjoyed, had been made. It was their purpose to arrange an ideal city, which at the outset and before a lot was sold should be designed by the ablest landscape engineers, with every modern convenience of water and sewerage system, electric lights, splendidly-constructed streets and concrete sidewalks. More than this, the city which they planned was to be

initial unit of which represents an outlay of \$4,000,000; a by-product coke plant representing an expenditure of \$3,500,000; a brick refractory established by a Pittsburgh concern, which was built at a cost of \$300,000; an acid plant representing an investment of \$300,000; a by-product tar plant costing \$200,000, together with several smaller enterprises, even down to a dairy farm of 10 acres, planned for the purpose of supplying the people with fresh butter, milk and eggs, making daily deliveries to the homes of Corey. Five trunk-line railroads pass through Corey, which, moreover, is connected with Ensley and Birmingham by an electric line. Its proximity to the great steel plant at Ensley makes it an ideal location for the skilled workers of that great industrial institution.

It is an interesting fact that within a radius of three miles of Corey are found all of the ingredients entering into the manufacture of iron and steel. The investment of the United States Steel Corporation in this district, of which Corey is practically the central point, already amounts to about \$63,000,000. With its ideal location, its splendid railroad facilities and its charm as a place of residence, Corey is constantly attracting new enterprises. That it is destined to become one of the leading cities of the South in population,



TYPICAL COREY HOME.



TYPICAL FOUR ROOM BUNGALOW, COREY.



TYPICAL FOUR ROOM BUNGALOW, COREY.



THE PLAZA, COREY.



A COREY BACKYARD

Views of Corey
Typical of
Streets, Parking and
Residences



SMALL OPEN-AIR CLASS, PUBLIC SCHOOL COREY

beautiful, adorned with shade trees and shrubbery and flowers. Broad thoroughfares were laid out, sweeping in majestic circles along the hillsides; a civic center was provided with tennis court, baseball diamond, cinder path and concrete wading pool for the children, and other places of recreation and amusement. In the heart of the city a beautiful plaza was brought into being. The pictures on this page give some indication of how the streets have been lined with trees, how thousands of shrubs have been made to combine in one harmonious scheme of development, of civic betterment and the creation of the city beautiful.

The early plans for Corey have been carried out to such a fullness and perfection that today Corey is everywhere regarded as the highest type of a town.

In establishing Corey 253 acres of land were acquired adjoining the holdings of the Steel Corporation and its allied companies. More than \$1,000,000 have been spent in the improvements mentioned. It is not surprising, therefore, that Corey began immediately after it was thrown open to the public to grow, nor is it surprising that this growth continues on a cumulative scale. Today the city has a splendid hotel, many well-appointed stores, a handsome bank building, one of the most modern and beautifully-furnished postoffices in the South, and scores of attractive homes, ranging from charming little bungalows of four and five rooms each to splendid residences of the most modern type. The industries, the establishment of which made Corey a necessity, include a wire and rod mill, a subsidiary of the United States Steel Corporation, the

as well as in commercial and industrial importance, is a prediction which has been made for it and which is now in process of fulfillment.

AS AN INVESTMENT OPPORTUNITY COREY IS WITHOUT A PARALLEL.

It is heir to all the growth and greatness of Birmingham and the unrivalled Birmingham district. Less than forty years ago the site of Birmingham was a stretch of old fields; on them today stands a city of 140,000 inhabitants. Ensley, at the gates of Corey, grew from a waste place into a city of 20,000 inhabitants in less than 18 years, and those who had the wisdom to act on their foresight by investing in Ensley property have made fortunes. Ensley has produced its millionaires as well as its rails. Corey, with a more commanding location, with all these years of advance embodied in its physical plan, with more behind it than Ensley had even ten years ago, and with a far more certain future ahead, is a much richer field for the investor; its promise is greater than even Ensley or Birmingham has ever held out, and is underwritten by actualities, by things already done and by things that will assuredly be done. Money invested in Corey now is certain to double, triple, quadruple. Corey invites your intelligent consideration, your close investigation. It shrinks from no acid test in the laboratory analysis. The Jemison Real Estate & Insurance Co. of Birmingham, Ala., will be pleased to send you price list and literature relating to Corey and to answer any questions. Write to them and learn more of Corey and its marvelous possibilities.

Gadsden, Ala., a Great Iron, Steel and Diversified Manufacturing Center

SOME years ago the officers of the Dwight Manufacturing Co. of Lowell, one of the greatest cotton manufacturing concerns in New England, recognizing the southward trend of the cotton industry, decided to make a thorough investigation of the entire South and build a big mill at the point which in their judgment, all things considered, seemed to offer the greatest advantages, climate and healthfulness being important factors. The location selected was Gadsden, and the mill was built outside the town at Alabama City, to all intents and purposes a part of Gadsden.

When men long identified with the steel industry and the making of wire in the West, and afterwards in the Birmingham district, where they had for years operated a large wire plant, decided to build a modern, up-to-date combined furnace and steel plant, they made a thorough investigation not only of Alabama, but of other parts of the South, with a view to finding a location which, according to their judgment, would be the most ideal one for assembling the raw materials and turning out and marketing the finished product. They, too, selected the Gadsden district and built at a cost of some millions of dollars a great iron and steel plant.

These two cases illustrate the whole story. Here were two enterprises, officered by men with wide knowledge of manufacturing opportunities, and climatic and health conditions, to whom the whole country was open. As a result of their investigations these plants are located at Gadsden. The Dwight Manufacturing Co. built a mill, which has been expanded until it now represents an investment of over \$1,500,000, consumes 25,000 bales of cotton annually, and employs 1700 operatives.

The iron and steel undertaking has been expanded until it represents an actual cash investment of many millions of dollars. In the near future it is to be still further enlarged. It employs in the Gadsden district over 2000 men.

The Alabama Consolidated Coal & Iron Co. has at Gadsden two furnaces with a daily capacity of 500 tons of pig-iron. This plant is universally recognized as one of the most modern and up-to-date in the country. It gives employment to over 800 men.

The Gadsden Car Works, employing over 600 skilled laborers, are builders and repairers of railroad cars. This, like other Gadsden plants, is being constantly enlarged to meet increasing trade. Other manufacturing interests in Gadsden illustrating the wide diversity of the industrial life of this community include the Southern Shovel Manufacturing Co., which, according to the testimony of users, produces the best shovels made in the country; the A. & J. Manufacturing Co., makers of superior cooking and heating stoves that find a market throughout the South and as far west as the Pacific; the Campbell Manufacturing Co. and the Coosa Pipe & Foundry Co., both of which are makers of soil pipe and fittings that likewise sold throughout the country from the Gulf to the Pacific. For over forty years the Kyle Lumber Co. has been one of the noted industries of Gadsden. Its product of soft and hardwood lumber has made its owners rich and demonstrated the possibilities of the lumber industry at Gadsden. The Southern Manufacturing Co. is rebuilding, at a cost of over \$100,000, its plant which was recently burned, and will continue the manufacture of flooring, sash, doors, blinds, etc. The Weller-Christopher Manufacturing Co., the Connelly Bros. Boiler Works, the Queen City Gin Co., the Fullington Machine Works, The Etowah Fertilizer Co., the Gadsden Fertilizer Co., Cassels Milling Co., Cook Bros. Pottery Co., The Gadsden Marble Works,

the Gadsden Brick Co., the Legard Lime & Stone Co., the Hammond Mining Co., the Gadsden Harness Co., the Tri-City Gas Co., and other smaller industries materially help to swell the volume of manufacturing business in and around Gadsden, giving employment in the aggregate to several thousand hands and making Gadsden, which has by some been called the "Peerless City of the South," and by others the "Queen City of the Coosa," a very hive of industrial life. Gadsden invites other industrial plants. It will exempt them

from taxation for five years and render every possible encouragement. Its labor conditions are unsurpassed. It has a high class of labor, well paid and contented, and here the open shop prevails. Over 8000 laborers with a pay-roll approximating \$300,000 per month are employed in Gadsden and the immediate vicinity.

Typical of the civic pride and enterprise of Gadsden people the Business Men's Club offered a bonus of \$150,000 in cash to the Southern Iron & Steel Co. to induce it, when it was contemplating moving from Birmingham, to locate its rod, wire and nail mill at Gadsden. It captured the prize not because of the bonus, but because of natural advantages and the spirit of enterprise which found expression in such a cash offer.

That illustrates the enterprise of Gadsden; it is to this spirit that Gadsden's great progress is largely due; for while Gadsden has natural resources unsurpassed, these would be but "buried talents" if the people of Gadsden were not alive to the utilization of this situation.

The Coosa River, navigable by steamers for over 200 miles, a magnificent body of water, is now being opened up by the National Government with a view to giving direct water transportation to the Gulf of Mexico. In the improvement of the Coosa the opportunity will be provided for the development of over 300,000 hydro-electric horse-power.

The Little River, on Lookout Mountain, near Gadsden, which will be utilized for hydro-electric power, will, according to the latest revised estimates, furnish 50,000 horse-power. Here are possibilities for hydro-electric development, and plans are already under way for the carrying out of these great power schemes, which will ultimately give to Gadsden electric power equaled by few cities in America.

Gadsden has five railroads and one electric car line. Its growth is illustrated in the fact that while the census of 1900 gave it a population of 4284, that of 1910 showed 10,557, while at the present what may be called Greater Gadsden, which includes the suburban manufacturing

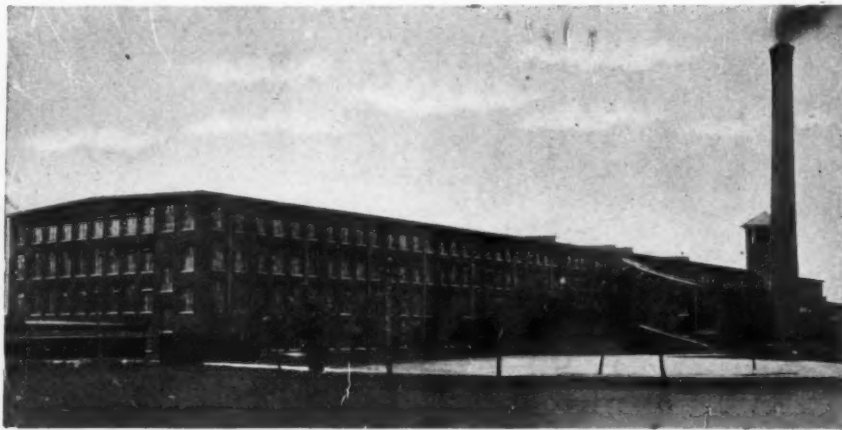
places, has a population of about 25,000, all connected by an electric car line.

The city owns its own water-works plant, has five brick school buildings, costing \$125,000; a courthouse, a public library, public parks and a fire department, all representing an aggregate investment of \$477,500. It has 12 churches of different denominations, a number of them fine brick structures of attractive architectural design. The United States Government is erecting a public building to cost \$200,000. The volume of freight traffic for 1911 figured up over 2,500,000 tons, as compared with 1,320,000 tons in 1900 and 2,134,000 tons in 1910. The city has a modern sewerage system, well-paved streets, electric lights and other modern conveniences. It is finely located on a beautiful plateau at the southern end of the famous Lookout Mountain. A more delightful or healthful climate cannot be found. There are four prosperous banks, two National and two State.

The Business Men's Club of Gadsden invites correspondence from manufacturers, bankers, merchants, investors and others. The president of the Club is Mr. Otto Agricola, and the secretary Mr. W. R. Phillips.



FOURTH STREET, GADSDEN, ALA.



DWIGHT MANUFACTURING CO., GADSDEN, ALA.

Ideal Section of Mineral Resources, Agricultural Wealth and Climate—Etowah Co., Ala.



A RICH agricultural region with soil and climate that make possible the growing of the widest range of agricultural products, in the very heart of a mineral section marvelously blessed with a wide variety of minerals, great in quantity as high in quality, cannot be found in many parts of the world, but such is Etowah County, Alabama, of which Gadsden is the county-seat. This section presents a rare combination of advantages. It is a region of rich plateaus and fertile valleys, of mountain ridges and foothills, splendidly watered by many streams, and having the advantage of the Coosa, one of the great rivers of the country, running from the mountain section toward the Gulf, furnishing transportation for steamers of considerable size, and destined ultimately under the development work of the Government to be so opened up for all the year round traffic that it will become one of the great highways of commerce, draining one of the richest valleys of the world and furnishing to the farmer, the manufacturer and the merchant cheap transportation which will forever regulate railroad freight rates.

Etowah county has an area of 542 square miles, or 346,880 acres. According to the Soil Survey, made by W. S. Lyman of the United States Department of Agriculture, and C. S. Waldrop of the Alabama Department of Agriculture and Industries, twenty different characters of soil, adapted to almost every variety of farm products, are to be found in this county. Here are broad, undulating valleys of the Coosa River, the Warrior River, and many large and small creeks. Here also are the level or gently rolling plateaus of Sand Mountain and Lookout Mountain, and a mountainous region characterized by a succession of ridges, alternating with beautiful, fertile, limestone valleys. These mountain ranges are known all over the land for their exceptional health conditions and their fruit-growing potentialities, as well as for their rich mineral resources. The county has an elevation varying from about 500 to 1500 feet above the sea level. The main drainage is toward the Gulf of Mexico, and is effected largely through the Coosa River and its tributaries.

Not only is this county rich in these fertile soils, but it is likewise rich in minerals, including coal, iron ore, limestone, building stone, cement rock, clays and many varieties of timber, including hardwoods as well as soft.

The Hon. Cecil A. Grenfell of London, a member of the English Parliament, largely identified with great financial interests of England and chairman of the Board of Directors of the Southern Iron & Steel Co., a \$27,000,000 company operating at Gadsden as its central point, said of this section:

"I am very much impressed with the great possibilities of the Gadsden district, where there are mineral resources in close proximity such as I believe exist in very few, if in any other, parts of the world."

To the development on broad lines of this plant, Mr. Grenfell is giving his entire time and bringing to this work the financial resources available through his strong connections in England. If the reader of this seeks information in regard to the fertility and the variety of the soils of Etowah county, a letter to his Congressman will bring him a report on the Soils Survey of Etowah County; and if he seeks information as to mineral resources his Congressman will send him Bulletin No. 400 of the United States Geological Survey. The reports of the United States Government experts on soil and minerals are considered the highest to be had, and the people of Etowah offer the testimony of these experts as substantiation of their claims.

The climate is healthful and delightful. The summers are long and pleasant, but never uncomfortably hot; the winters short and mild. None but those who have lived here can have any idea of the delightful summer temperature, where the nights are almost invariably cool and invigorating. The average temperature is 61.2 F. The average rainfall is 52.6 inches annually, pretty evenly distributed throughout the year. These statements are based

on the reports of the United States Government Weather Bureau. Alabama has the lowest death rate of any State in the Union. According to the United States Government health statistics the average for the State is 12.8 deaths to the 1000 population. Etowah, with its mountains, its rolling hills and its thorough drainage, is conceded to be the healthiest section of Alabama. It is abundantly supplied with the purest water from fountain springs on the mountain plateaus, in the hill regions and in the limestone valleys. Here are found beautiful streams of limpid water teeming with

fish. Here also are many fine health resorts, including Sulphur, Chalybeate and other springs, whose waters are noted for their beneficial effect in many diseases. Owing to the invigorating climate men and animals can work in the sunshine during the heated term with far greater comfort than in the North and West and without any fear of sunstroke. There is no record of a sunstroke ever having occurred in this section. In the high hills and mountain regions it is nearly always necessary to sleep under covering at night. Equally as attractive conditions prevail in the winter, for it never gets too cold for man or beast to work outside during the winter months.

The principal crops

grown in this county are cotton, corn, wheat, oats, sorghum, sweet and Irish potatoes, watermelons, canteloupes, strawberries, practically all varieties of vegetables, peaches and apples, while stock-raising, dairy farming and poultry for the market are making progress. Some alfalfa and other grasses are likewise being raised with much success.

What can be done in corn-growing is shown by the work of Junius Hill, a boy in knee breeches, belonging to the Boys' Corn Club of Etowah county.

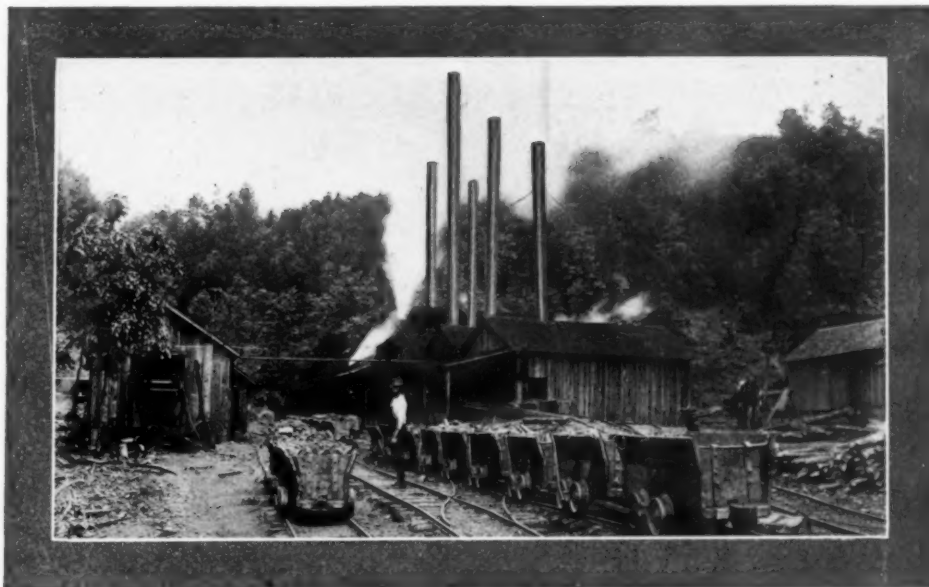
In 1911, on one acre of land, he raised 212.5 bushels of corn at a cost of 8.58 cents per bushel. From the economic standpoint of cost of production in connection with the yield, this is probably the world's record. More than two bales of cotton per acre were raised by a number of farmers in the county last year.

Where industrial development, such as that existing at Gadsden, Alabama City, Attalla and other towns furnish an ever-growing market for the diversified products of farming, dairying and poultry-raising, etc., the farmer, the fruit-grower and the trucker are exceptionally well situated. Etowah county meets these conditions. The lands are yet cheap, and often can be bought at such a price that the first year's crop will pay for them in full. This has been done in several instances. It was done last year by T. J. Ramey, who moved to Gadsden in 1911, bought a tract of land near the city, lived in town and produced enough corn and cotton in one year to pay the entire cost of the property.

The United States Census reports show that the farm lands of Alabama more than doubled in value between 1900 and 1909. It is a safe prophecy that they will more than treble, and in many cases quadruple in value during the next decade. No better investment can be found than the farm lands of Etowah county. They are indeed "dirt cheap," for in many cases they can be bought at present at from \$5 to \$25 per acre; and this, too, for land that will pay for itself the first year.

Through the Business Men's Club of Gadsden the people of this county extend an invitation to good people from all parts of the world who seek to better their condition. They are cordially invited to investigate, for those who investigate invest. Here is a region which we believe to be one of the most favored in the world. With the marvelous advancement which

is now taking place throughout the South no more attractive spot can be found than Etowah county for the farmer, the merchant, the manufacturer, the mechanic, and, in fact, for all who are seeking home-making opportunities in a region abundantly blessed by nature with soil, climate, mineral and timber resources. The Business Men's Club of Gadsden will take pleasure in sending information and descriptive literature to all who desire it.



RED ORE MINES.



JUNIUS HILL.

Champion Corn Raiser. 212.5 bushels on one acre at a cost of 8.58 cents a bushel. Gadsden, Ala., Etowah county. 1911.



A PARK-LIKE SCENE IN ONE OF THE GREAT

John H. Kirby and His Enterprises--Strong Factor in Houston's Growth



HOUSTON'S lumber sales today amount to some \$40,000,000 a year. But little more than a score of years ago they amounted to nothing. Today every lumber manufacturer in the Western Louisiana and Eastern Texas fields, save one, has headquarters at Houston. There are now 48 corporations engaged in the wholesale lumber trade, with a combined capital of \$87,000,000, whose offices are in Houston. Until John H. Kirby established headquarters of the Kirby Lumber Co. here in 1890 there were none.

Manifestly, the lumber industry plays an important part in the present-day rank of Houston as a great trading center, and it is a mere statement of fact that the establishment of headquarters here and the development that the lumber industry has shown are coincident with the beginning of Houston's remarkable expansion in every line of commerce and finance.

John H. Kirby never has done anything in a small and feeble way. When he went into the lumber business as a young man he went into it on such a scale that he immediately became known as a factor in the industry. Therefore, when he removed the headquarters of his company to Houston it was a circumstance that could not fail to attract widespread comment and consideration. As subsequent events clearly prove, the establishment of the headquarters of the Kirby Lumber Co. at Houston helped powerfully to concentrate public attention on Houston and to make it the commercial and financial center it is today.

Starting practically at nothing, the lumber industry has developed until the \$40,000,000 worth of yearly business today includes shipments from the Houston-Galveston Gulf ports of millions of feet of pine lumber for many foreign ports, as well as supplying a vastly widened domestic market.

Skyscrapers house the extensive offices of the Kirby Lumber Co. and others whose headquarters are in Houston, and without question there had been no need for many of the imposing office buildings in Houston today had the lumber interests never centered here.

By the same token, there would have been much less occasion for the great increase in banking capital—some seven times over—that has occurred since the advent of Kirby here, nor could the bank deposits have shown the growth from the single million or so of the early 80's to the \$35,000,000 of the present day had Houston never become the lumber center that it is.

While Houston's development is many-sided, and no single element is entirely responsible for her growth, it is unquestionably a fact that the advent of the timber interests in so extensive a manner, together with the presence here of the big men who are at the head of the lumber corporations, has been a powerful factor in the city's growth. Not alone is this due to the fact that the capitalization, the volume of business and the bank deposits of these interests have grown to such notable magnitude, but also because men like John H. Kirby have also taken a prominent part in many other lines of Houston activities. Mr. Kirby has from the first been interested in banking operations

here; has made large investments in real estate and in buildings; was the builder of a railroad, now a part of the Santa Fe system, and has been identified with every movement for the betterment and advancement of the city, section and State. And following his pioneer work of establishing headquarters at Houston, those who followed him have in almost every instance become also important factors in the general growth of the city, many of the skyscrapers and other notable developments here having been due to the enterprise of large lumber operators who came here in Mr. Kirby's wake.

The Kirby Lumber Co., of which John H. Kirby was the founder, the president, from the beginning to the present day, and always the dominating factor, was organized July 5, 1901, and chartered under the laws of Texas. The capital stock is \$10,000,000, \$5,000,000 of which is 7 per cent. cumulative preferred and \$5,000,000 common. There was a remarkable demonstration of esteem and appreciation of Mr. Kirby's personality, achievements and worth as a business man, citizen and friend when he returned from the East in the latter part of November, 1901, after having successfully financed his \$10,000,000 company. Neighbors and fellow-townsmen gave a banquet in his honor, and there were present distinguished editors, railroad officials and business men from as far away as Chicago, Washington and Baltimore, as well as hundreds of leading citizens from all parts of Texas.

The Kirby Lumber Co. controls an enormous stumpage, aggregating more than 9,000,000,000 feet of standing yellow pine, which is located in eight counties of Southeast Texas and the Calcasieu region of West Louisiana. The company owns 14 sawmills, with an annual capacity of 400,000,000 feet. The lands and mills are located conveniently to the Gulf ports of Port Arthur, Bolivar and Galveston, from all of which ports there has been a marked increase of timber exports in recent years.

Mr. Kirby has built up around him a remarkably efficient corps of assistants and fellow-officers, and his enterprise has become one of the very big features of a very big State.

A long-time friend and business associate, Mr. Joe H. Eagle, an attorney of Houston, pays this tribute to the character and achievements of Mr. Kirby:

John H. Kirby--An Appreciation

By JOE H. EAGLE.

From Colonial times up to the present the South has furnished her full share of great men to our common country. But, prior to the Civil War, and indeed until long subsequent, the common sentiment of the South sent its great men either into the professions or into politics, and measured the extent of their talents by their achievements in those fields of endeavor. But for the past quarter of a century the public thought of the South has been rapidly crystallizing along other lines: as to the importance of the work before her citizens, with the result that the genius of her sons has come to be very largely



A LUMBER SCENE OF ONE OF THE



THE GREAT TIMBER TRACTS OF THE KIRBY LUMBER CO.

employed in the development of her material resources. The natural result of such reversal of point of view and practice has been and is to regard as her great men those who develop her marvelous resources and thus promote the prosperity and happiness of her people.

Judged by any of the highest standards, Hon. John H. Kirby of Texas is one of the great men of his day and generation.

A man is great who, without extrinsic help, develops a broad learning; or who achieves a great and solid name throughout the country as a sound business man; or who wins success and achieves distinction in his chosen profession; or who accumulates, out of raw resources lying dormant and unused about him, a fortune of available millions by their development; or who becomes a man of such excellence of heart and goodness of conduct as to win and hold the unshaken love of every honest man with whom his life comes into contact; and especially so if his fortune, honestly earned, is devoted to the betterment of others by investing it in industries that give employment and opportunity to multitudes. But a man is notably a great man when he combines in his personality, achievements and conduct all of such accomplishments; and undeniably such a man is Hon. John H. Kirby.

He was born in 1860 on his father's little farm, near Peach Tree Village, in Tyler County, Texas—right in the heart of the virgin yellow pine forests of Eastern Texas. He worked on the farm until he was 19 years old, attending the country schools; then for a season aided his uncle who was county tax collector; then was a clerk in the State Senate for two or three sessions; then went to the Southwestern University for a year, and then was admitted to the bar, and at the age of 23 married and settled down and began the habit of incessant labor and continuous optimism that are his distinction to this day. He was successful in real estate law from the beginning. One of his earliest cases was defending the landed interests of some Boston gentlemen who had invested in his county. So persistent was the young lawyer in asserting the legal rights of his non-resident clients against the prejudice or predilection of court and jury, urged by influential counsel, that he achieved the victory; but he achieved far more—the friendship, confidence and influence of his clients. He already realized the enormous opportunity of fortune in the primeval forests all about him. A trip to Boston put his dream into their minds. The result was that they placed funds at his disposal for investment under the condition that he buy, manage, safeguard and sell pine timber at fair market prices, returning their investment with interest and dividing the profit. The first few ventures were so successful and satisfactory that they and an increasing clientele furnished funds for the purchase of more than 100,000 acres of pine land in 1887, which he placed in a company called Texas and Louisiana Land & Lumber Co. This was gradually followed by the organization of twelve or fifteen other corporations and partnerships, whose aggregate holdings were more than six hundred thousand acres—more than one-half of which belonged to Mr. Kirby, besides an individual ownership of over ninety thousand acres. These became the basis of the Kirby Lumber Co. and the Houston Oil Co., although, upon their organization in 1901, they acquired, by purchase in the open market, hundreds of thousands of acres more.

Another notable achievement of Mr. Kirby's was the construction, in the panic years of 1893 to 1895, of the Gulf, Beaumont & Kansas City Railway from Southern Pacific connection at Beaumont, Texas, northward through the heart of his vast timber holdings, and then its sale to the Santa Fe system,

thus bringing another potent factor into the development of Eastern Texas. With the organization of the Kirby Lumber Co. in 1901, with its \$10,000,000 capital, of which Mr. Kirby owned a large control, with its 8,000,000,000 feet of timber under ownership and contract standing on 1,300,000 acres, with its fourteen modern mills with an aggregate annual cutting capacity of 400,000,000 feet, with its 200 miles of railway and sixty locomotives and 700 cars and its herd of 1000 mules, with its vast commissaries and its army of several thousand employes, the genius of this industrial captain had full swing. Having fairly made his enormous fortune—not out of the wreck or misfortune of others, but by the development of the latent energies and raw resources of his native forests, it was his highest ambition to make those lonely pine forests the home of busy industries and to pay the largest possible wages so as to contribute to the welfare of his people and to connect the civilized world with Eastern Texas by the binding ties of mutually profitable commerce—a mission in which he has fully succeeded.

He made Houston the headquarters of his company, and thus made that city the center of the lumber industry of the Southwest. Since then others have acted likewise, so that at present there is scarcely a lumber concern in the Southwest whose operating or sales office, or both, are not located in Houston.

Mr. Kirby moved to Houston in 1890 in order to be in the midst of better banking and business facilities, and has always been and now is a leading factor in the rapid upbuilding of that city. He has invested large sums in its real estate, buildings and enterprises, and is always a moving spirit and generous contributor and investor in all worthy and substantial enterprises of Houston.

Mr. Kirby's life is an example and should be an inspiration to the young men of the South. Born without any advantages except honest parentage, good health and clear vision, he has added hundreds of millions to the wealth of Texas; he became a millionaire at 30, and many times a millionaire at 40; he has, throughout life, exemplified the Golden Rule, and is one very rich man who is universally trusted and loved by all classes of the people of Texas. They know that not one dollar ever came to him wrongfully; that his fortune has been made in developing his country and giving advantage in life to multitudes of others; that he is generous and liberal and loving even to a fault; that he envies no man and hates no man, and regards life as a gift of God for the doing of all possible good and the scattering of all possible sunshine; and that he lives practically the command to love his neighbor as himself.

Mr. Kirby has a keen regard for his financial obligation and those of his companies. He has put his private fortune behind the obligations of every company he has ever controlled. One of his companies was once forced into a receivership, not on account of any debt or default, but on account of the construction of a contract, and after he had successfully managed the litigation through five years and had prevailed, his first act, on reorganization of that company, was to pay in full with interest even those who had failed to establish their just claims and were legally barred.

Such a man, at the zenith of his age and power, is an inspiration to the young and a pride to his State and country. With a few more men like Mr. Kirby, the South, the most favored in natural resources, would soon be the most densely populated section of our country—wealth would spring out of her bosom as by magic, the hum of her industries would fill the land, and the white sails of her commerce would gladden every sea.



F THE MILLS OF THE KIRBY LUMBER CO.

Here Nature Has Done Its Best, Tryon, N. C.



IMAGINE an encircling mountain range averaging 2500 to 3000 feet in elevation, in the shape of a horseshoe or three-quarters of a circle, the open part being out to the south, and shut in by these mountains from wintry blasts, a rolling stretch of land, of hill and valley, averaging 1000 to 1200 feet in elevation, and then you can get some idea of why Tryon, N. C., and the surrounding territory have been so marvelously blessed by a climate which alike in winter and summer is well-nigh perfect.

Across the high mountain ranges sometimes sweep the heavy winds and snows of high altitudes, and striking these encircling mountains to the north and west pass over the whole of the Tryon region to points much farther south. In the winter the radiation of the heat from the sun as it strikes through the open part of the horseshoe against the surrounding mountain sides, gives a warmth of climate and an exhilaration to the air which once experienced is never forgotten. In summer the southern breezes sweep through the same opening of the horseshoe and give to all the Tryon region a charm of summer climate which has made it as popular with the people of the lower South who at that season seek the mountain regions of Carolina as it is with the Northern and Western people who have learned of its well nigh perfect winter climate due to the exceeding dryness of the atmosphere. Here is found what is widely known as the Thermal Belt, one of those phenomena through which Nature displays an infinite variety of attractions, which follows narrowly along this range of mountains. In this Thermal Belt there is a fogless, dewless and frostless zone in which vegetation puts out much earlier in spring and tarries much later in autumn than even in sections much farther south.

In this mountain-girded region, which includes a large part of one of the most prosperous counties of North Carolina, is to be found not only a perfection of climate but a charm of scenery, from that of the beautiful valley to that of the wild and rugged mountains, from that of the gentle stream as it meanders through the level lands to that of the roaring torrent as it rushes and leaps

forth of the modern hotel there are many smaller hotels and boarding-houses which, winter and summer, cater to the traveling public.

If Tryon had no other advantages than its superb climate and its beautiful scenery to enchant the visitor and to divert his attention from every vexing care as he walks or rides over the many miles of mountain and valley roads, it would still have an asset sufficient to insure a great future, now that the active development of this locality is to be vigorously pushed. But in addition to climate and scenery it is a country of many natural resources. Timber of many varieties is found in abundance. The poplar, the oaks, spruce, chestnut, locust and walnut are here available for manufacturing purposes. A wide variety of manufacturing, such as furniture, flooring and general inside finish, could be profitably conducted here where the supply of raw material is so abundant. Down the mountain sides and in the gorges that here and there break through these mountain ranges, are many streams that offer exceptional advantages for hydro-electric development.

Nature has apparently done her best to make this region an exceptionally attractive one for the manufacturer, the farmer and the fruit grower, as well as for the health and pleasure seeker. The valley lands are of exceptional fertility, yielding largely of wheat and corn, while on the hillsides and in places in the valleys the fruit grower has been provided with the most ideal conditions which nature could give. On these hills and even on the mountain sides there is a deep, rich soil where nutritious grass springs up freely, making exceptionally good pasturage, as soon as the timber is cut away. Trucking is carried on to some extent, and all the elements combine to make this an ideal section for the trucker and the poultry raiser. Orcharding has not been engaged in to any large extent in a commercial way, but apple trees flourish and produce big crops of exceptionally fine fruit whenever properly cared for. The peach grows here to absolute perfection, and the largest peach which the writer, somewhat familiar with the peaches of all sections, has ever seen was produced on a little mountain farm in this region.

Very considerable progress has already been made in the vineyard business,



A PANORAMIC VIEW OF TRYON LOOKING TOWARD THE MOUNTAINS.

through the mountain gorges that never fails to amaze and delight the stranger, a variety and beauty which never pall on those who are so fortunate as to be among the dwellers of this fair region.

The air of the Tryon section has an exhilaration to it and a dryness which quickly bring renewed strength and health to the invalid, and which make everyone feel like expanding their lungs that they may take in a deeper draft and breath in a new vigor from the balminess which seems fresh from Paradise. The broken foothills of this magnificent mountain range, the rolling hills and the fertile valleys, enable every home builder to select a spot which to him seems to offer a greater charm of mountain or valley view than any other. No man in all this region needs to be shut away from the superb panorama which Nature in its most lavish mood has here spread.

Tryon and the surrounding country are interesting from whatever angle they are viewed. Here is a region that has always, since first known, appealed to the health and pleasure seeker, to men and women seeking surcease from the strain and worry of life's strenuous battles, to sufferers from rheumatism or throat or heart or lung affections; here many of the world's noted men and women have gathered from time to time as health demanded rest from toil or a breath of this balmy air. This was a favorite spot of Sidney Lanier, the poet of the South. To this region William Gillette, the actor-playwright, has often come that in the balmy sunshine of this mountain engirdled spot he might regain his strength. Noted writers, men who have been leaders in science, in finance and in business generally have for years been among the visitors. Many who have come to visit have been so delighted and so benefited that they have built permanent homes here. In a community having as small population comparatively as Tryon, it is most unusual to find it of such a cosmopolitan character as is indicated in the fact that at a recent banquet twenty-three different States were represented by residents of the town.

Two excellent tourist hotels are fully equipped for taking care of a large number of visitors. Of these Oak Hall, managed by Mr. E. Brownlee, stands on a delightful eminence only a few hundred feet from the railway station, its wide verandas presenting an inviting appearance, and from them may be had views of valley and mountain of entrancing beauty. The Mimosa Hotel, conducted by Mr. W. H. Stearns, is located about a mile from the village on a gentle elevation in a valley of wonderful loveliness and fertility, from which one looks up to the surrounding mountains with all their rugged grandeur, and feels that he has indeed found a haven of rest. Both of these hotels are fitted with all modern conveniences. For those who do not want all of the com-

forts of the modern hotel there are many smaller hotels and boarding-houses which, winter and summer, cater to the traveling public. Some eighteen years ago A. J. Lemort, a Frenchman, whose physicians gave him no hope of recovery, decided to come here to test the climate, of which he had heard much, for rheumatism. Just south of Tryon he secured a small tract of hill land with a log cabin on it, and, being familiar with grape growing, put out a vineyard. His health and his vines alike flourished, and now, hale and strong, he has many acres in grapes, a handsome home, a comfortable bank account, and is a large producer of wines. W. T. Lindsey, a Kentuckian, came here a good many years ago, likewise in search of health, and he, too, is now the fortunate owner of a highly profitable vineyard. Other profitable vineyards are to be found within a short distance of these two.

Recognizing the exceptional advantages of the Tryon section, D. M. Hoke of Greenville, S. C.; A. L. Hill of Tryon and W. B. Hellen of Tryon, and their associates, some months ago organized the Hoke-Hill Real Estate & Investment Co., with Mr. Hoke as president, Mr. Hill as vice-president, and Mr. Hellen as secretary. This company secured a large amount of land about three-quarters of a mile from Tryon, and is now laying it out with a view to making it an ideal place for the home builder. In order to add to its attractions, an artificial lake will be created, a hydro-electric plant provided for lighting streets and houses, a water-works system established, and other improvements made in order to give to the residents of this property every advantage of a modern, up-to-date suburban development. This company, organized and officered by men long familiar with the advantages of this region, will have a very great effect in making Tryon known to the world. The Hoke-Hill Company will also deal in timber and farm lands, water-power sites, etc.

Tryon has one bank now and Mr. S. B. Wilkens is erecting a large double brick structure with the intention of organizing another bank. It is his purpose also, when his building has been completed, to start a general mercantile establishment. Visitors to Tryon find so many tempting rides and drives that horses and vehicles are in constant demand, and with a view to aiding in meeting it Mr. Wilkens has established a large livery business.

With its cosmopolitan population, with its many citizens of education and culture, and visitors from all parts of the country winter and summer, Tryon is an exceptionally interesting place for permanent residence. It is well provided with churches, including the Congregational, Catholic, Methodist, Baptist and Episcopal. An excellent graded public school and a high-class private school provide educational facilities.

HOUSTON, TEXAS

A Graphic Portrayal of the Growth and Strength
of the Commercial, Financial and Industrial
Metropolis of the Southwest

"WHERE 17 RAILROADS MEET THE SEA"

February 22, 1912



HOUSTON SHIP CHANNEL.
Scene Taken Three Miles Below Houston.

HOUSTON TEXAS

Type of All-Around City
Growth in Manufacturing, Trade,
Finance, Transportation, Commerce

	In 1880.	In 1912.
Population	23,408	*105,000
Banking capital.....	\$600,000	\$7,000,000
Bank deposits.....	\$1,000,000	\$60,000,000
Value of manufactures.....	\$1,000,000	\$35,000,000
Capital invested in manufactures.	\$250,000	\$20,000,000
Number of wage-earners.....	2,500	†11,000
Total annual payroll.....	\$2,000,000	\$10,000,000
Shipments by water.....	\$5,000,000	\$52,000,000
Number of railroads.....	9	17
Annual lumber sales.....	None	\$37,000,000
Jobbing trade.....	\$4,500,000	\$125,000,000
Total commerce of city.....	\$8,000,000	\$177,000,000
Taxable valuation.....	\$5,502,416	\$125,000,000
Cotton shipments (bales).....	527,756	2,500,000

*Including suburbs. †Includes railroad shop employees.



HIS in statistics is the skeleton of Houston's upbuilding since 1880. Until within a decade this development was pioneering work; today it is along broad, substantial, enduring lines, and Houston is marching with majestic stride to the very forefront. Well within the twentieth century there will be a city here of a million souls.

Houston epitomizes the enormous energy and the resistless force which is transforming a wilderness into a teeming garden. The vaquero and the ranchman are filing by—are all but gone—and behind them, in endless procession, comes an army of tillers of the soil and builders of cities. In such hordes they come—nearly two million in ten years' time—that never in the history of the world has there been seen such a migration of the human family as Texas has received.

Great cities are built up—and in no other way built up and maintained—by the requirements of surrounding and tributary territory. Large populations require a large trading center, and commerce demands facilities for trade. Were the people of Houston but a tenth as virile, energetic and alert, the inexorable laws of trade, the tremendous pressure from without, would force the founding of a trade center here. With as keen and wide-awake a citizenship as any place can show, with every energy synchronized and surcharged with the maximum of dynamic force and power, Houston, wholly alive to the requirements of today, vividly surveys the horizon of the morrow, and stands four-square before the world. What ought to be done is being done, so that in achievements of the present and plans for the future, Houston's example of intelligent, vigorous activity and broad constructive genius may well be deemed an inspiration and a guide for all the cities of the South.

Strong, united men can build a city without advantageous aids; activity in the development of a section will create a mart of trade through the mere necessity of its being. Where all the elements combine the very stars in their courses join in the light to make the place supreme.

At Houston all the elements combine as at no other city in the South, and as can hardly be approached by many cities on the globe. Back of it all is a tributary territory of magnitude and fertility unequalled in the world. From the west bank of the Mississippi River to the Rocky Mountain Range, and from the waters of the Gulf to the nation's border on the North, Houston's rightful territory lies. For the greater part of this vast area Houston is the logical seaboard metropolis, the seat of commerce, trade, industry and finance. The great railroad systems of the Mississippi Valley give testimony to this fact in their presence here, every one of which is in Houston with either an individual line, or through connections or traffic arrangements made. Hill is here, Yoakum is here, and Hawley, and the Gould Lines and the Santa Fe, and the Harriman Lines have here their greatest Southern headquarters. Reaching clear to the Canadian border there is a territory already rich, but only partially developed, which must pour as through an inverted cornucopia, an ever increasing wealth of commerce, trade, manufacture and agricultural product, destined for the ports of the world. With the opening of the Panama

Canal there will begin the development of an ocean trade to and from Southern ports that will tax the facilities of all of them to the very utmost. The Mexican Gulf is counted on by every student of economics to develop a traffic exceeding the greatest the Mediterranean ever knew. The possible ports on the Gulf are few. Those which can serve the royal valley of the Mississippi are but two or three. With twenty-five feet of water, which the completed ship channel will give, Houston's facilities will be imperatively demanded to supplement those of Galveston, Port Bolivar, Texas City and every other possible port that may be developed along the 54 miles of deep water between Houston and the sea. And Houston has the peculiar, permanent advantage of being the one great city of the Southwest where rail and water meet.

If the Panama Canal had never been begun; if the railroads here served only the 260,000 square miles of territory which Texas contains, and if the State were barren of minerals and timber and were restricted in products to crops of forage and grain, as in some of the States to the north, there would still be sufficient occasion here for the upbuilding of an important center of trade. Who can limit the possibilities of development, then, when it is considered that Houston is already a gateway for commerce between the world and a vast region of surpassing richness, stretching for a thousand miles or more to the north; that all this region has only just begun to see the development it is to know; that the opening of the Panama Canal will foster foreign commerce along lines as yet undreamed of, and that Texas itself is an empire of wealth as yet but little more than explored?

There are more cattle and better ones on the farms of Texas now than when the herds roamed the unfenced ranges unhampered and alone, and yet the dairying and the packing industries are as yet almost unknown; there are estimates of 24,000,000,000 tons of lignite in the State, excellently adapted to conversion into producer gas, and also into briquettes, which is now being mined at a rate of only about 1,000,000 tons a year; there are large deposits of bituminous coal, mined as yet to but little greater extent than the lignite; there is a petroleum production of 12,000,000 barrels a year, much of which is shipped out of the State; there are millions of tons of phenomenally high-grade iron ore, as yet hardly more than surveyed; there are ores of many kinds, including even gold, silver and mercury, practically lying dormant; there are building stones in ledges of unknown extent, hardly worked at all; there are clays of many kinds, and cement rock, in which developments have scarcely begun; there are hardwoods of great variety, only partially utilized, and vast forests of long leaf yellow pine, the product of which is largely shipped from the State in timber form.

This incomplete array of the natural and but slightly developed resources of the State indicates the possibilities for a tremendous expansion of manufacturing at centers such as Houston. In addition, in an appraisement of future possibilities here, it must be considered that Houston is the natural trading point for an agricultural section so wide in extent and so varied in product as to constitute the foundation for a great city, if built on agriculture alone. Texas produces a fourth or more of all the American cotton crop.



BIRD'S-EYE VIEW

Houston handles two-thirds and over of the Texas crop, which gives it pre-eminence as a cotton trading center. Present water-way facilities secure a saving in freight rates of some \$4,000,000 a year on cotton shipped for export from Houston, and insure the continuance of Houston as a leading cotton market. Being the center of the cotton trade in this section, the development of Houston as a center of cotton manufacture is logically certain, just as Houston has already become the center of cottonseed products. There are six modern oil mills here, with an investment of \$2,225,000, and an output worth \$4,000,000 a year, which includes the refined oil as well as the minor products.

Texas is fifth among corn-producing States; Texas wheat has taken frequent premiums at international expositions; Texas tobacco has the Havana flavor, and Texas peaches and tomatoes are prime favorites in every market—all of which facts contain possibilities of advantage to Houston's many-sided development.

Houston is a rice center, the second largest primary rice market in the South, the annual production from about 282,000 acres in the district around Houston being 2,500,000 bags. Sixty-two per cent. of the entire year's production was handled in Houston last year. Incidental to this development is the location of seven large rice mills in Houston, representing an investment of \$1,150,000.

Cane sugar is produced in Texas to the extent of some 68,000,000 pounds a year, almost all of which is marketed through Houston. There have been about 25,000 acres in cane, some production having for many years been from the Rio Grande Valley, but mostly from the alluvial lands of the Brazos and the Colorado. In recent years there has been a great impetus given to cane growing in the Brownsville region, numerous planters and sugar manufacturers from Louisiana and other outside places having come in, attracted by the fertility of the soil, the longer production of the cane without replanting and high yield of sugar to the acre of cane. Houston is the beneficiary of all this development, as it also is to a major extent in all the wonderful transformation in the Brownsville section, where domains of cactus and mesquite, a drug on the market at a dollar or so an acre, have in less than ten years been cleared, irrigated and cultivated, and now bring \$100 and more.

Here and in all the coast country is a great trucking development, the early vegetables and small fruits from this entire region being in great demand in Northern cities, which they reach when those markets are bare, and hence bring a very profitable price. Houston's produce market has developed into one of the important commercial assets of the city. The rich gulf coast country depends on Houston for a market and Houston is well qualified to handle these products, especially perishable fruit to northern points of distribution. The produce business of Houston amounts to over \$5,000,000 annually. More than twenty concerns are engaged. Texas fruit is handled in great shipments, in many cases the crop being purchased while in the field or on the tree, loaded direct and sent to Houston, where the cars are distributed to various parts of the country without the seals being broken.

A citrus fruit development has been undertaken that with intelligent handling will mean much in the way of increased revenues to the trade of Houston, and in the Brownsville section California grapes, comparing with the finest product of the San Joaquin Valley, have been grown. Magnolia figs are everywhere a success throughout the Gulf Coast region. Much attention is being given to the scientific raising of pecans, which in time become a most profitable crop.

So much, in brief, for the advantages which soil, climate, nature, geography and outside developments provide. Now for a consideration of the human element, the personal equation, the people of Houston themselves, who have the progress of the city in their hands, and who by their conduct can hinder and retard or stimulate and aid the working out of the city's destiny. Two things,

among all the rest, are sufficient to establish the fact that nowhere is there a more public-spirited, intelligent and dependable population to be found. There are instances enough in every direction—in public and private improvements of all kinds—to prove that the whole citizenship is imbued with the spirit of progress, so that a public demonstration is a confirmation and not a discovery. One of these illustrations is afforded in the adoption and support of one of the best commission forms of government in the country; the other, that the vastly important ship channel, involving an expenditure of \$1,250,000 by the city and county, was so solidly backed and supported by the people of Houston that the project received nearly 93 per cent. of all the votes cast at the election held a year ago.

Houston's water-way, the Buffalo Bayou, is insignificant in width and depth within the original limits of the town. A few miles out, however, it rapidly broadens and deepens, until it becomes an arm of the sea. The importance of a water-way between Houston and the Gulf has been recognized from the time the city was founded in 1836, when the defeat of Santa Ana by the forces under General Sam Houston at San Jacinto broke the Mexican yoke and made Texas an independent republic. Improvements in the water-way have been made from time to time since 1840, first a six-foot channel being aimed at, and this being repeatedly deepened until 18 feet minimum had been secured. Old Commodore Morgan, whose prophetic vision and early enterprise stamp him as one of the foremost builders of his time, recognized the logic of the situation when he ran his boats from Morgan City, La., to Clinton, Tex., then the head of navigation on Buffalo Bayou, six miles from Houston, some fifty years ago. Later on the Government took over the work that Morgan had begun, and up to 1909 had spent some \$2,000,000 in deepening and widening the channel, giving a minimum 18-foot channel from the Gulf to a turning basin, four miles below the center of Houston, and restoring a channel for barges and smaller craft to the foot of Main street in the heart of the town. A report of the Government engineers made that year showed that the work of securing a channel of 25 feet minimum depth, 100 to 125 feet wide, with turning basin 600 feet in diameter, was about 50 per cent. completed; would cost about \$2,800,000, and at the then rate of progress would require a long term of years to complete.

This report was as a call to arms to the wide-awake people of Houston. It was a matter of pride that the present development of the ship channel had given Houston an enormous advantage over every other inland town, the railroads having no recourse but to meet the water rates. Houston's ship channel was already carrying a trade of \$40,000,000 or so a year. With the completed, deeper channel, not only barges and light draft vessels, but ocean-going steamships could arrive at the Houston docks and depart under full load.

"Why wait for this benefit?" was the rallying cry. "Let's get it now!" was the slogan of the hour.

Delegations from the commercial and business organizations of the city, along with the representatives of the city and county governments, went to Washington, and after threshing the matter out with engineers and Congressional committees it was finally agreed by Congress that an appropriation of \$1,250,000 would be made for the immediate completion of the channel project, provided a like amount was raised by Houston and Harris county, the engineers having reported that \$2,500,000 would finish the work if it was done without delays. This was in accordance with the proposition made by the Texas delegations, and they returned home to start a campaign, which resulted, in January, 1910, in an almost unanimous vote in favor of the project.

Thus is assured deep water for Houston, which will be nearer to the Panama Canal than any other great seaboard city of the United States. The tremendous advantage this will be to Houston may be realized when it is considered that even if the deepening of the ship channel had not been undertaken the present channel would maintain Houston as the metropolis of the



OF HOUSTON.

Southwest because of the water rate competition it affords with railroads. For illustration, the ship channel enforces a rate of six cents per hundred pounds on cotton for a distance of nearly fifty miles, which the railroads are compelled to meet. For the same distance by rail, without water competition, the rate on 100 pounds of cotton is 20 cents. In this matter the Houston ship channel now saves to the cotton interests of Texas alone over \$4,000,000 annually.

This is merely an example, yet it shows how transportation rates in the territory are all based on Houston's, and Houston secures the primary benefits. Rail rates from seaboard points to interior cities in the Southwest are computed on the basis of the water rate to Houston, plus the local rate from Houston to the point of distribution. Railroads must meet the water rate or retire from competition, so that Houston enjoys the advantage of being able to ship goods by rail direct through her sister cities at a lower rate than they themselves must pay.

This situation alone would make Houston a metropolis. Houston controls the transportation situation and has become the railroad center of the territory. The seventeen railroads that converge in Houston stop here. Each is a terminal, and trains destined for beyond are all made up in the Houston yards. This inspired the slogan of the city, "Where Seventeen Railroads Meet the Sea."

In anticipation of the deepening of the ship channel Houston already is planning an elevation from a sub-port of entry to a full independent port. A bill to that effect was prepared for Congress, and it is considered altogether probable that Houston's port will be elevated by the time the channel is completed. Houston was recognized as a port of entry July 18, 1907, since which time the receipts of the Houston customs surveyor have doubled with each succeeding year.

Meanwhile the city of Houston is preparing for the perfected ship channel by constructing wharves and slips at the turning basin, the upper termi-

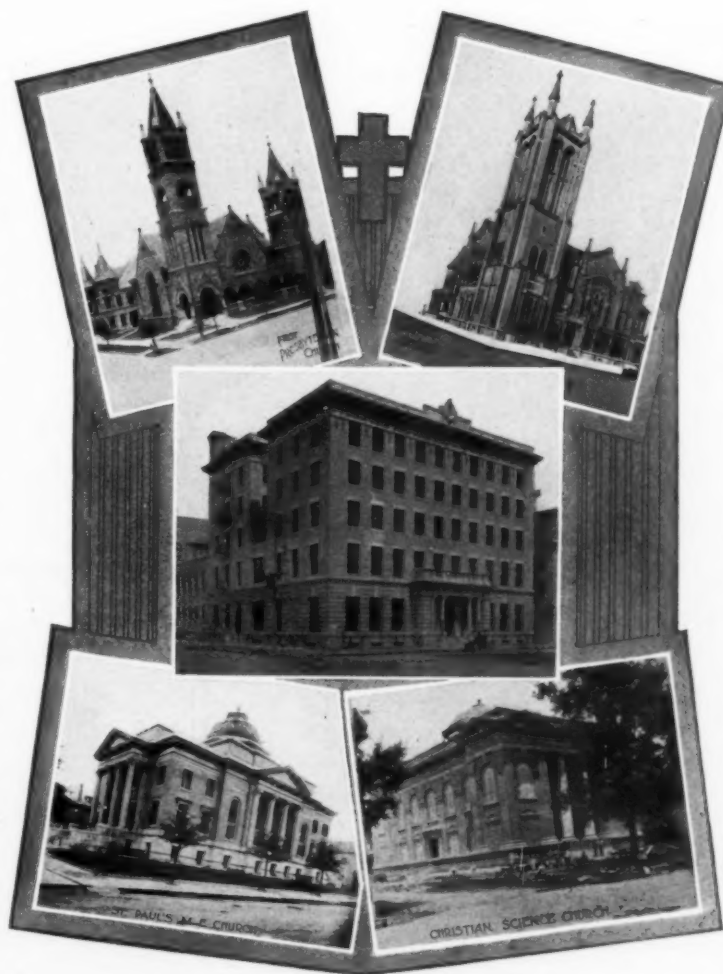
nus of the ship channel, which is 600 by 1300 feet in dimensions. This system of wharves and slips will be owned and maintained by the municipality, and will be free. On the city's docks warehouses will be constructed and every modern facility provided for the rapid and economical handling of freight. Three railroads also have frontage on the basin and are constructing wharves and docks and installing modern terminals.

"The Manchester of America" is the name already applied to Houston. There are those who suggest that when the Houston ship channel is entirely

the commission form in July, 1905. The new regime took hold with a \$400,000 deficit, the city's finances demoralized and the city's credit under par. After six years of commission government Houston is farther ahead than even the most optimistic anticipated. The city administration is on a sound business basis, and the people of the Greater Houston of today are working hand in hand with the administration for a great metropolis. The administration has instilled public confidence. It is an inspiring example of the administration of a city's affairs upon a business-like basis under commission government.

Commission government as exemplified in Houston probably is the most perfect of any city operating under a charter. The Mayor and four commissioners, all elected at large, instead of by wards, succeeded the Mayor and twelve aldermen of the old government. These four commissioners with the Mayor constitute the city council or legislative department of the city government. The executive power is vested in the Mayor, but by an ordinance for the administration of the city's affairs a large portion of executive or administrative power is subdivided into different departments and a committee is placed over each department, and one of the four commissioners nominated by the Mayor is what is known as the active chairman. The Mayor and four commissioners are members of each committee. The active chairman of the committee practically has control of the administration of the department, unless his views upon the matter are overruled by the whole committee; but by the organization of the committees the active chairman does his work to a certain extent under the supervisory direction of the Mayor, who is in the last analysis the head of each committee and the person in whom the executive power of the municipal government ultimately rests.

The organization of the city administration is the same as that of a great corporation. The assessed valuation may be known as the capital stock of this municipal corporation; the Mayor



HOUSTON NOTED FOR BEAUTIFUL CHURCHES.

finished it might be more appropriate to call Manchester the Houston of England.

A city that can apprehend and utilize an opportunity such as the situation in the case of the ship channel gave may well be relied on to adopt every means that clearly promises an advantage. Hence it need be no surprise to find here a city administration which is a model of its kind. Houston's municipal affairs are in the hands of a commission, operating under a charter from the State Legislature, and conducted in the same way that a great corporation manages its business affairs.

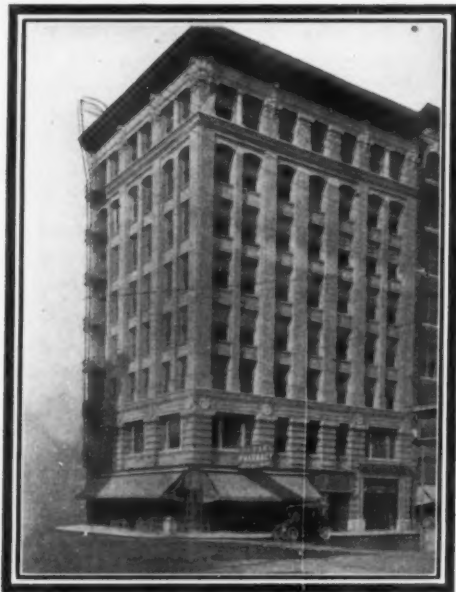
The municipal administration changed from the old aldermanic system to

is president and the four commissioners constitute the board of directors. All other persons connected with the government may be classed as employees of this municipal corporation, for at a word from the Mayor they may be removed from their positions the same as the president of a corporation may dismiss an incompetent employee.



FIRST NATIONAL BANK.

The only deviation from the routine of the private corporation is that following an executive session of the Mayor and commissioners they meet in open council meeting, which is merely to legalize and make public the business transacted by committee during the week. These council sessions last from five to fifteen minutes. No speeches are made nor discussions entered into. Petitions to the council under the new form are unnecessary. As soon as a petition is filed it is referred immediately to the committee concerned, for a majority of the commissioners are always in session and business can be and is attended to at a moment's notice. For instance, any citizen or citizens who want a street paved, taxes adjusted, nuisances abated or any other matter decided, have only to call at the Mayor's office to have the matter promptly adjusted. After a hearing the matter is decided by the council in the presence of the applicant.



PAUL OFFICE BUILDING.

In a purely business manner, unhampered by political considerations, every person in the employ of the city is responsible to the department heads, who in turn are responsible to the Mayor. Every person but the commissioners and controller may be removed peremptorily by the Mayor. In the case of the commissioners and controller they may be removed from office by a majority vote of the council. The result is a harmonious, systematic corps of employees performing their duties. Each and every one of them is working for the interests of the city, for they know if they do not some other person will succeed them who will do his duty.

Thus politics is obliterated under commission government. The Mayor and commissioners are selected for their fitness. They come from the city at large, instead of from wards. Ward lines are obliterated, as well as politics.

The commissioner comes from the city at large. Employees are not selected because of any certain party affiliation, but for their fitness instead. Politics is obliterated from the public schools. The school board is nominated by the Mayor and confirmed by the council. They in turn select a school superintendent. The teachers are selected for their fitness, and no commissioner can even suggest the name of a teacher to the school board. All the council has to do with the schools is to supply the revenue. Its connection with the public school system begins and ends there.

One of the most important features of the Houston charter pertains to the granting of franchises. No franchise can be granted for a longer period



SCANLAN OFFICE BUILDING.

than thirty years, unless it is submitted to a vote of the legally qualified voters of Houston and approved by them. The expense of such election must be borne by the parties applying for the franchise. In case the franchise is approved it may be granted for the term of years as submitted, but in no case for a period longer than fifty years. The city council may on its own motion submit any ordinance granting a franchise to the vote of the people of the city. By a provision of the Houston charter, if 500 qualified voters of the city petition the council to call an election to determine the granting of any particular franchise, it is incumbent upon the council to do so. The Houston charter reserves the right in the city of Houston to regulate the rates of all public utility corporations.

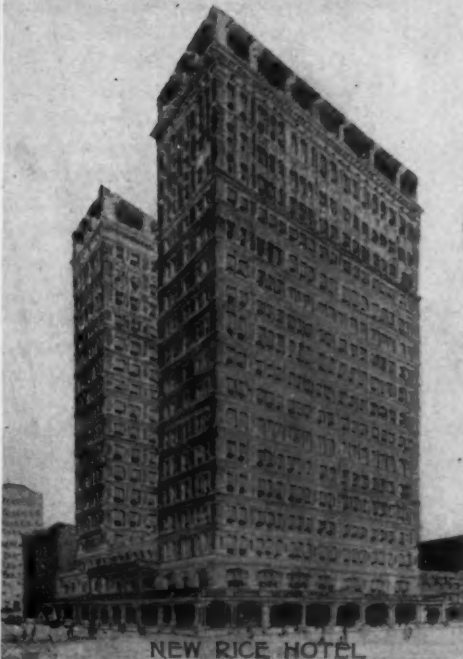


CHRONICLE BUILDING.

In a discussion of the operations of the commission government a synopsis of what was accomplished in the first five years of the regime may be pertinent. Inaugurated in July, 1905, the new government found a floating debt of over \$400,000 and an empty treasury. The city virtually had no credit. There was not a single merchant that desired to transact any business with the local

government. Gloomy as the prospect was, the authorities went about their task with a determination to better conditions. Useless and expensive offices were abolished, some consolidated. A national bank was made treasurer of the city, allowing only a salary of \$50 per month for clerk hire and the bank to pay interest on all balances to the credit of the city. The city attorney was instructed to institute and file suits for all delinquent taxes. This caused to flow into the treasury nearly \$100,000 alone in eight months. By the strictest economy there was redeemed in the first eight months of the first term \$306,202.47 of the old floating debt, and the monthly bills and salaries of the employees were also paid promptly.

By that time the merchants of the city were anxious to again do business with the city local government, and credit was restored, not only at home, but abroad. In the five years of commission rule the city of



NEW RICE HOTEL



SAVOY HOTEL



BENDER HOTEL



BEACONSFIELD FLATS

Houston wiped out all floating debt and has given to the taxpayers out of the treasury, without the issuance of a single bond, these permanent improvements:

City Attorney, Law Library	\$974.10
Assessor and Collector, Block Book System...	10,000.00
City Hall, Furniture and Fixtures	1,123.67
Police Department,	4,096.03
Fire Department, Buildings and Equipment...	66,150.45
Electrical Department...	26,551.21
Health Department.....	6,168.26
Parks	52,007.53
Streets and Bridges.....	65,714.10
Asphalt Plant.....	3,000.00
Auditorium	332,276.02
Ship Channel.....	98,027.40
Sewers	85,212.18
Paving Streets.....	179,261.96
Water Department, Extension of Mains and Improvements.....	247,932.02
Wharves and Slips.....	33,109.89
School Buildings.....	340,323.65
Total Improvements.....	\$1,865,757.17



ROSSONIAN APARTMENT HOUSE

Extraordinary Expenses.

Storrie Certificates.....	\$73,200.00
Refund Paving Certificates.....	120,308.70
Sinking Fund.....	120,220.00

Making a Grand Total.....\$2,179,585.87

All of this being paid out of current revenues, besides eliminating the floating debt.

While these improvements were going on the tax rate was reduced 30 cents on the \$100. The price of gas was reduced 50 cents to \$1, while \$10 was cut from the price of arc lights. The city of Houston purchased the water system from a private corporation which was charging 50 cents per thousand meter rate (pumping water from a bayou). Under the city's management 15 cents per thousand is charged and the water taken from artesian wells.

Public utilities corporations pay one per cent. annually of their gross receipts into the city treasury. The tax rate was reduced from

\$2 to \$1.70. (The real taxable value of Houston is about \$225,000,000, but it is assessed at \$125,000,000.)

Salaries of teachers, firemen, policemen and other employees of the city, long on the rolls, faithful and efficient, have been increased.

In a great measure the unqualified success of commission government in Houston is due to the tireless efforts of the head of the government, Hon. H. Baldwin Rice, who was the first Mayor under the new form six years ago, and who has been re-elected each term by heavy majorities, indicative of the confidence the people have in a man who straightened the tangled thread of Houston's municipal affairs and gave them a government which is the basis of Houston's prosperity today. To Mayor Rice is accorded the distinction of being the foremost public-

spirited citizen of Houston today. He is a man of independent means, vitally interested in the material welfare and the progress of Houston, and he performs the duties of Mayor with entire devotion to the best interests of the city and with a highly patriotic sense of duty to his fellow-men. With him



In the administration of the city's affairs are Jack Kennedy, Mayor pro tem. and chairman street and bridge committee; J. J. Pastoriza, chairman finance and revenue committee; Robert L. Jones, chairman water committee; W. J. Kohlhauff, chairman fire committee. Commissioner Kennedy also is chairman of the ordinance committee, and Commissioner Pastoriza also presides over the board of appraisement and the committee on taxation.

The Water Department is one of the most prominent figuring in municipal progress since the inauguration of the commission form of government. The water system was purchased by the city in October, 1906, the cost being \$901,000 for the entire system. The private corporation took water from a bayou and a few artesian wells. The city cut out the bayou supply, holding it for emergency only, and developed the artesian well system. The capacity of the plant was increased fifteen million gallons per day, the increase in the cost of operation being about 15 per cent., while the revenue was increased 40 per cent. Besides the new pumps and compressors added, new mains were laid and the fire service extended. Today the plant has a capacity of 33,000,000 gallons of pumpage per day, although the average daily use is but between eight and nine million gallons per day.

The entire flow of water is taken from artesian wells, there being 45 wells of varying depth and volume in Buffalo Bayou valley near the pumping plant. Not all of these wells are in use, there being a great overabundance of water, assuring Houston pure water and plenty of it for all time.

A department of the city in which the administration takes a special pride is that of parks and boulevards. Houston has five parks—Sam Houston Park, the largest and most complete, with the greatest number of improvements, which includes with the annex 29 acres; Cleveland Park, 56 acres; Elizabeth Baldwin Park, 5 acres; Highland Park, 26 acres, and a block of ground in the Second ward donated to the city by a private citizen. Recently by purchase the city of Houston added to Elizabeth Baldwin Park, which originally was 2½ acres, doubling the area. This park is in a heavy natural grove and will be transformed into one of the beauty spots of the city. These parks are thronged daily, and band concerts are given in two of them at the city's expense during the summer months.

It remained this year to bring the consummation of the largest park and boulevard plans ever attempted in Houston. This project embraces the construction of a park and boulevard system throughout the length of White Oak Bayou, in the Fifth Ward, from the foot of Main street, where the White Oak Bayou connects with Buffalo Bayou, to Houston Heights Boulevard. The boulevard will follow the valley of White Oak Bayou and will be two miles in length. Its completion is projected about the time the new Main street viaduct is completed, connecting the north and south ends of Houston. The proposed boulevard will enter the city from the north over the viaduct, connecting with Main street.

The boulevard will be constructed on both sides of the bayou with ornamental concrete arch bridges over the sharp bends of the stream. Along the banks and in the center between the two roads the space will be parked. The whole contemplates the transition of one of the eyesores of Houston to a place of beauty and delight.

Nothing is more important than the health of a city, for without sanitation and measures to conserve the health of its people, no city can expect capital to invest, nor labor to be attracted.

Houston's average death rate per thousand is as low as the lowest registered city in the United States, the rate averaging 13.1 per thousand. Notable is the fact that of this total the negro constitutes about two-thirds.

Eminent authorities agree that the Health Department of Houston is not excelled in the United States, while few cities have such excellent facilities. A general staff is maintained in the City Health Office, consisting of the health officer, an assistant, pathologist and bacteriologist, graduate nurse, pharmacist, four sanitary inspectors, sewer officer, fumigating officer and milk inspector. This staff, working together under the direction of the health officer, contributes service and supplies free, except in the case of those able to pay, who are asked to pay the cost of the supplies used, though all services are free, and all persons declaring themselves without funds are cared for.

A ward is maintained at a Houston hospital by the city where its charges are sent when necessary. For all hospital attention and medicines the city pays. At the health office in the City Hall a small operating room is maintained, where minor operations are performed by physicians. Fifty patients can be cared for in the city ward at the hospital at one time.

Sanitary conditions here are of the best. The people as a whole willingly observe the laws laid down by the city for the preservation of the health. Houston may be called a model city in sanitary and health conditions, made so by a competent health department, stringent laws and regulations, and a citizenship that takes pride in conserving its own health.

An important adjunct in the work of maintaining the health of the city is the disposition of the city's sewerage. In many cities the solution of this problem is a vexatious one. Houston's present system has had a most successful test in ten years' use.

By this system all the sewerage of the city is evaporated or otherwise disposed of over filtering beds five miles from the city. Within the city limits a pumping station is maintained, which collects and deposits for pumping all sewage of the city. From this station the sewage is forced through five miles of pipe line to the filtering beds. These beds are constructed on a gravity basis and occupy 25 acres. The sewage reaches these beds thoroughly dissolved, where it spreads over a coke formation. From the upper beds the



water slowly filters to the lowest beds, where it has become nearly pure. From the beds this purified water passes to the bayou. Periodically these beds are cleaned and the deposit, which has become dry and brittle, is scraped off.

City garbage also is disposed of by the city, and in such a way that the debris is used commercially. All garbage, whether it be tin cans or the dead bodies of small animals, is placed in a

mammoth crematory of special design and completely incinerated. When the garbage is reduced to ashes it is taken out and used for filling in street foundations. The entire system is conducive to good health and is one of the several perfected departments that go to make Houston a thoroughly modern city. All these improvements and additions to the working system of the city government have been installed or perfected since the inauguration of the commission form of government.

It is thus manifest that a well-rounded development is occurring here. The city is being made fit, comfortable and altogether modern so as to be a very attractive place to live in, while also a most advantageous one for business operations. Rail and water transportation rates will forever favor Houston, so that what has been undertaken here in commerce, trade and manufacture will seem a mere beginning. There must be an enormous expansion in the early coming years as the Houston territory develops and new trade relations are built up with the countries to the South. Hand in hand with this commercial and industrial development the city will expand and grow until it becomes a most notable example of civic progress. Already a city of beautiful homes, handsome churches, magnificent public and business buildings and excellent schools, Houston would be raised into civic pre-eminence by the Rice Institute alone were everything else here but the settings for a common college town. For the Rice Institute, now under way, will be not only the Cornell of the South, but an even greater one than that. Starting with a \$9,000,000 endowment, and in the hands of trustees of entirely adequate ability and judgment, here will be an institution where the most thorough training may be secured in every practical or ornamental branch of knowledge. In time it will become one of the greatest seats of learning in the world, reflecting honor and glory on Houston wherever knowledge is found.

In industrial expansion a very notable showing is made by the Houston of today, although manifest to any observer that the advantageous freight rates, abundance of raw materials at hand, cheapness of assembling materials and ease of distribution of finished product must give Houston vastly greater pre-eminence in an industrial way than it has yet achieved. There are now here 341 factories, making 282 different articles, the annual product being worth over \$56,000,000. Including railroad shops, 11,000 men are on the pay rolls, which total some \$10,000,000 a year, according to such recent statistics as are at hand. Some very interesting individual enterprises are among these industries, which include the only piano and organ factory



CITY HALL & MARKET



SOUTHERN PACIFIC R.R. HOSPITAL



HOUSTON HIGH SCHOOL

lumber trade with a combined capital of \$87,000,000, whose headquarters are located in Houston. The aggregate volume of business transacted by these companies is in excess of \$40,000,000. Two of these corporations have a combined capital stock aggregating \$15,000,000. The cut is confined almost entirely to long leaf pine, for which the section is noted, although several of the mills are now producing hardwood lumber. The field of operation is Texas and Louisiana,

and every important operator in these fields, save one, now has headquarters in Houston.

As a cotton center Houston occupies an unique position in that it is the largest inland port cotton market in the world. For the season of 1910-11, 2,464,107 bales were shipped from the inland port of Houston, the value of which was \$190,814,285.81. The total Texas crop for this

season was 3,258,651 bales, which shows that more than two-thirds of the entire Texas crop passed through Houston en route to foreign markets.

The cotton trade of Houston is easily the largest single item in the commercial life of the city. The largest firms of the cotton world maintain branch offices in Houston, which further emphasizes the importance of Houston as a world cotton center. Houston is the concentration point for the greater part of Texas and Oklahoma cotton, for Houston's railroad facilities, her great sheds and warehouses for concentration and complete facilities for rapid handling of the staple make possible the quickest handling from the field direct to shipside.

In this situation there are promises of a great cotton manufacturing development here when Houston really strikes the industrial stride that some day will be hers.

In the oil world Houston is one of the great centers of the trade.

Houston is the nearest large city to the rich oil fields of Texas and Louisiana, and in consequence attracts to its doors the directing offices of companies operating in this field. Twenty-three oil corporations maintain headquarters in Houston, one with a capital of \$50,000,000, the largest independent oil company in the United States. This company operates throughout the world, having its own lines of tank steamers and foreign agencies. The annual production of Texas petroleum averages over twelve million barrels.

A great wholesale trade is done by Houston jobbers, amounting to about \$125,000,000 a year. Houston's territory extends as far as the Brownsville country and has been built up through the alertness of Houston's merchants and the advantages the transportation facilities afford. The retail trade of Houston, excellently covering every line, aggregated \$51,000,000 in 1911.

In addition to being the railroad center of the Southwest, in the sense of having more lines of road than any other city in the section, Houston has a concentration of railroad headquarters, which makes her supreme. Here are the headquarters in the South for the Southern Pacific, which is housed in the only office building that system owns, a magnificent steel and concrete structure of nine stories height, only recently completed. The International and Great Northern recently moved their offices and shops from Palestine to Houston. This removal added 300 to the population of Houston and over \$40,000 a month to Houston's pay rolls. The headquarters of the Frisco lines in Texas were recently removed from Beaumont to Houston, and the headquarters of the Trinity & Brazos Valley road are here.

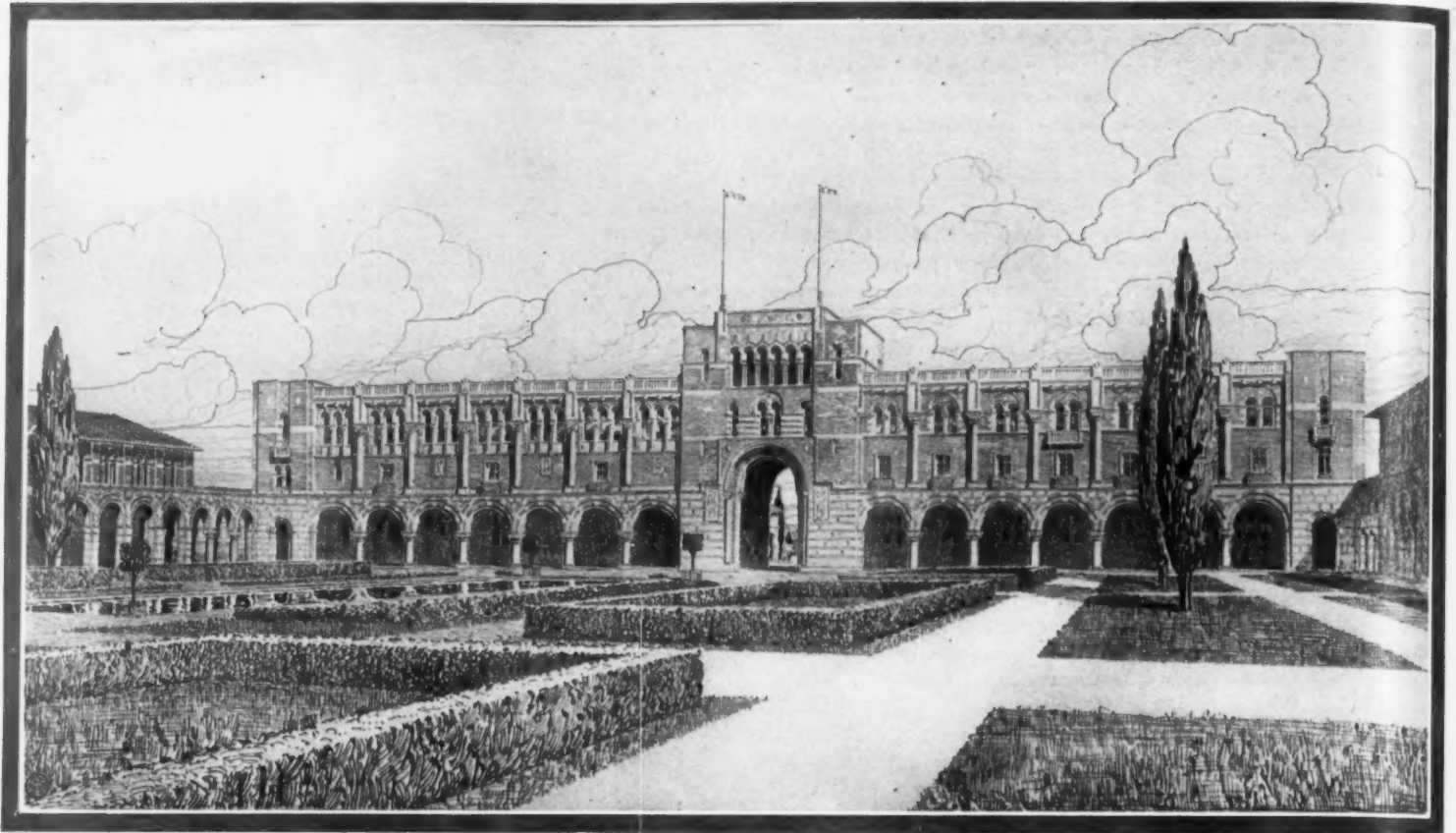
Houston's great volume of commerce and industry calls for heavy financing. Millions of dollars are expended annually in the movement of Texas crops and the development of resources. Financing of the Texas cotton crop alone exceeds \$225,000,000 annually. Concentration of such industries in Houston calls for vast sums in financing and for imme-



AUDITORIUM

in the South; the only oil mill press cloth factory in the South; car-wheel works, etc.

The logic of the situation suggests the certainty of a great expansion in wood-working lines, for Houston is a tremendous center for the timber trade. Beginning with the location of headquarters here by the Kirby Lumber Co., some ten years ago, there are now forty-eight corporations engaged in the wholesale



ADMINISTRATION BUILDING, RICE INSTITUTE.

diate needs. This situation has served to create in Houston great and powerful financial institutions. The banking houses of Houston are the finest in the State, their ramifications more extended and their wealth and power far greater than sister cities of her size.

Houston is the financial center of the entire Southwest. Six national banks and five trust companies operate in Houston with combined capital stock of \$7,000,000. The deposits, subject to check, amount to \$33,000,000, and the savings deposits to \$3,000,000. The gross bank clearings amount to more than one and one-quarter billion dollars annually.

The buildings housing the Houston banking institutions are among the most beautiful in the city. The majority are exclusive banking houses, although one institution recently completed a 12-story office and banking building combined, and another is installed in an eight-story building of its own.

Indicative of the progress Houston is making is the great building era the city has entered upon. In no way may it be considered a boom. Building is going on to meet the rapidly increasing demands of a growing city. Buildings are occupied upon completion, and in the cases of store buildings, warehouses and residences are rented before they even assume definite shape.

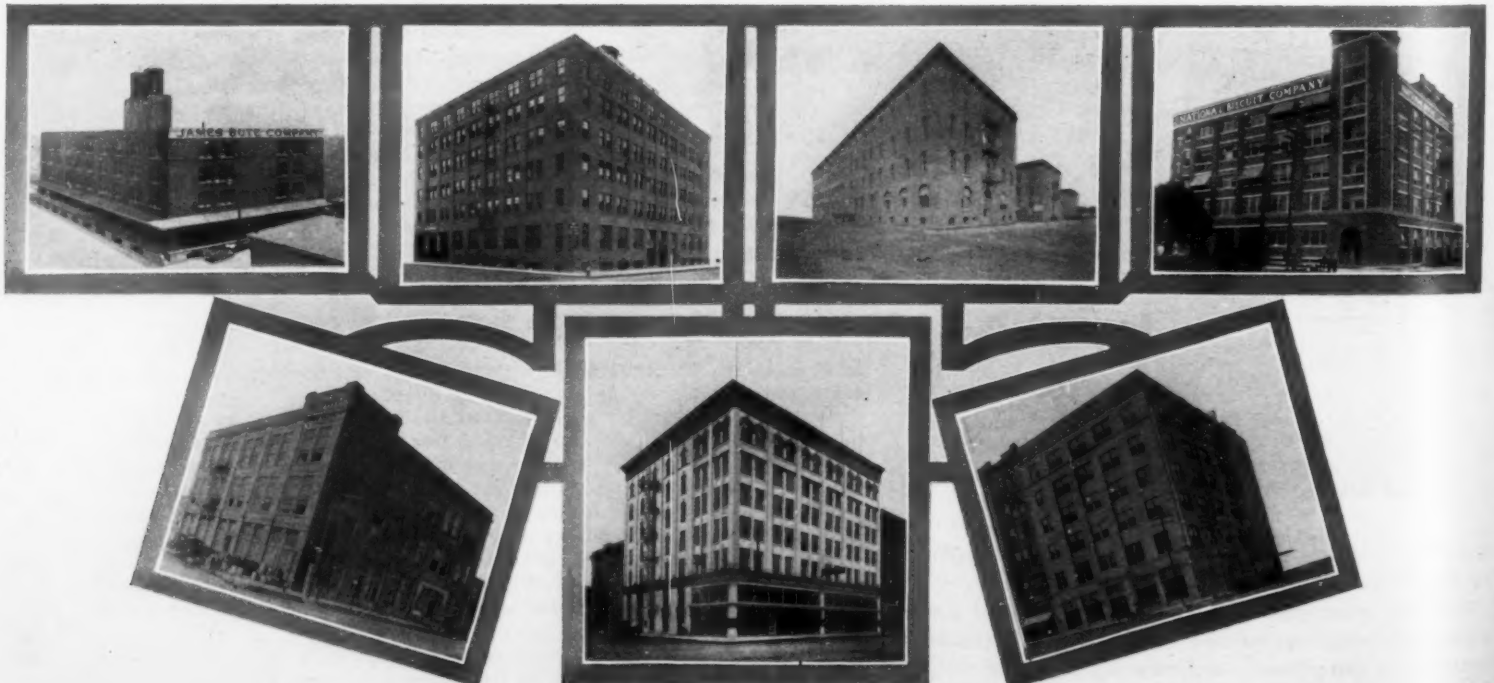
Within the past two years there has been expended in Houston over \$15,000,000 for building alone. A few years ago the skyline of Houston over the downtown section was even. It was then a six-story town. Today skyscrapers ranging up to 16 and 18 stories dominate the picture. In addition to the building in the downtown section, where skyscrapers are fast supplanting

the smaller and old structures, the residence section is building and expanding so rapidly that the city is constantly increasing its area in new and modern suburbs.

Today Houston has 28 tall buildings of six stories and over, the tallest being the \$1,250,000 eighteen-story hotel rising on the site of the old Rice Hotel in the center of the business section. The other new skyscrapers comprise a sixteen-story office and bank building, an eleven-story office building, including a new \$850,000 hotel; two nine-story buildings, including the only exclusive office building ever built by the Southern Pacific Railroad; six eight-story buildings, including two of the finest apartment-houses in the South; a seven-story telephone building and thirteen office, hotel and commercial buildings of six stories.

Outside the skyscraper class are a number of new buildings of special interest, notably the Houston municipal auditorium of steel, concrete and brick, seating 8000 persons, which was erected at a cost of \$400,000 and paid for out of the general revenues of the city. The Harris county courthouse, costing \$500,000; Houston Federal building and postoffice, \$500,000; station and terminals of the Houston Belt and Terminal Co., \$1,000,000; Rice Institute, possessing an endowment fund of over \$9,000,000, and the Majestic Theater, the finest vaudeville playhouse south of Chicago, are other buildings that show the substantial nature of Houston's developments.

In connection with building operations it is noted that the city of Houston is constructing one of the largest concrete viaducts in the country, being a



SOME SPECIMENS OF COMMERCIAL BUILDINGS.

bridge 1600 feet in length to connect the north and south ends of Houston, bridging Buffalo and White Oak Bayous and the network of railroad tracks in the Fifth ward. January 10, 1911, the people of Houston voted \$500,000 bonds for this project. Work is now under way on the structure, which will be completed this fall. The viaduct will form part of the boulevard project along the bayou and will be a continuation of Main street. The viaduct will

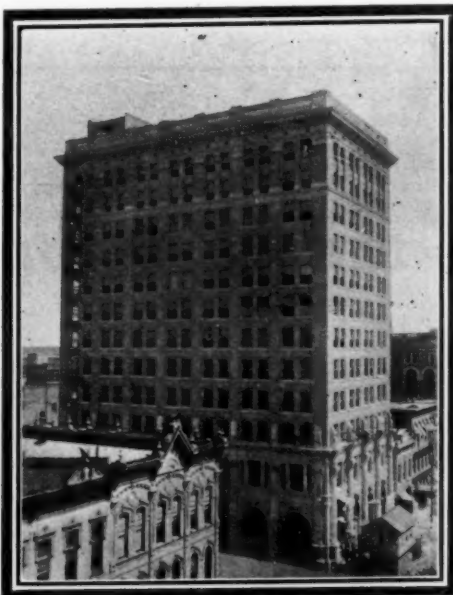


SOUTHERN PACIFIC BUILDING.

be paved with vitrified brick and will contain a double track for electric cars. It will be electric-lighted throughout, with a huge electric sign overtopping it flashing the words "Houston, the Metropolis of Texas."

The viaduct will not only bring the north and south ends of Houston into closer communication, but will serve to bring into closer contact the business interests of the two sections. Business today in Houston is well organized, and it is the solidity of business which has done much toward the making of a Greater Houston.

The different lines of business are well organized in their separate lines—the wholesalers, the manufacturers and the retailers and the professions and trades. There are two general organizations—the Chamber of Commerce of Houston and the Houston Real Estate Exchange. The realty men have as their interest the development of the entire Gulf Coast country of Texas, which is one of the richest in the world. It is a new country, as yet but little developed, but being in a semi-tropical zone its soil products ripen several weeks prior to any other section, which gives it first choice in the market and high prices. It is this section of the South that has for some years produced



UNION NATIONAL BANK BUILDING.

the first bale of new crop cotton, the first bale last year being raised at San Benito and selling for the record price of \$1015 on the floor of the Houston Cotton Exchange.

The Chamber of Commerce is composed of the organized business interests of Houston. It is the representative business body of the city, and has for its object the building of a Greater Houston and a more powerful metropolis. Its membership comprises the representative business interests of the city and is committed to the work of attracting industry to the city, of aiding the business firms of Houston enlarge and increase their business, and for the promotion of civic work within the city, its beautification, sanitation and health. Civic and commercial work is not attempted alone, but much is done towards giving Houston world-wide fame commercially, industrially and as a tourist point.

Houston has much to attract the tourist. Besides the many points of interest in and around Houston, an hour's ride from the city will bring the pleasure-seeker to the seashore, where surf bathing is found and all kinds of deep sea fishing possible. This trip may be made by steam road, automobile over the finest shell roads and boulevards in the South, or by an electric inter-urban railroad running between Houston and Galveston, which was opened over the great causeway for traffic last fall. Within a couple of hours' ride of Houston big game hunting, such as bear and deer, is found, with the variety of small game the prairies, thickets or forests of Texas afford.

At Houston the tourist can auto to his heart's delight, for 300 miles of shell roads and boulevards converge at Houston from all parts of the country. Three miles southwest of the city is located the Country Club with its large



STEWART OFFICE BUILDING.

domain. The Houston Country Club possesses the only 18-hole golf links in Texas, and was the scene of the last Texas State Golf Tournament.

Just below the Country Club, on the ship channel, is located the Houston Launch Club and its flotilla of over 300 pleasure craft. These boats range from the little "one lugger" power boats to beautiful sea-going yachts, some of the finest in Southern waters. An annual regatta is held by the club, which attracts boats from all over the Southern Coast area.

A trip down the ship channel 15 miles from Houston will bring the tourist to the San Jacinto battlefield, where 77 years ago Texas won independence from Mexico when Gen. Sam Houston routed and defeated the Mexicans under Santa Ana. These grounds have been improved and parked by the State, and it is a place always visited by the tourist while in Houston.

Houston offers attractions as a city to live in the year 'round. The summer heat is tempered by the Gulf breezes and the cool trade winds. Heat prostrations and deaths due to great humidity are unknown in Houston. The winters are mild, due to the same reason—the warm winds sweeping up over the Gulf of Mexico from the tropics. Snowstorms are unknown to Houston, green foliage prevails the year 'round, and for only about three months in the winter are overcoats occasionally worn.



CARTER OFFICE BUILDING.

Houston today is, in many respects, an ideal, even a model city. It is a tourist point the year 'round. It is the center of a country offering the greatest opportunities, and with the resources of this territory being developed and the city adding daily to its population, wealth and power, Houston, the metropolis of the Southwest today, is destined to be one of the recognized seaports of the world and one of the greatest trade marts of the nation.

LEADING FINANCIAL INSTITUTIONS OF HOUSTON

HOUSTON, THE FINANCIAL CENTER OF THE SOUTHWEST

Houston's pre-eminent financial strength among the cities of the Southwest is demonstrated by this statement, taken from latest government reports:

NATIONAL BANKS					Adding TRUST COMPANIES			
	Capital	Surplus and Undivided Profits	Deposits	Total Resources		Capital	Surplus and Undivided Profits	Total Resources
First National.	\$1,000,000	\$429,948	\$9,209,564	\$11,648,773	Bankers' Trust Co.	\$2,000,000	\$800,000	\$2,800,000
Union National.	1,000,000	342,243	7,634,277	9,222,433	Houston Land & Trust Co.	250,000	250,000	500,000
South Texas National.	500,000	459,514	5,981,328	7,805,843	American Trust Co.	500,000		500,000
Commercial National.	500,000	624,908	5,724,790	7,344,398	Southern Trust Co.	800,000	580,741	1,380,741
Houston National Exchange.	200,000	162,053	3,798,439	4,360,492				
Lumberman's National.	400,000	245,334	3,234,974	4,288,738				
Total.	\$3,600,000	\$2,264,000	\$35,693,372	\$44,670,677	Total.	\$3,550,000	\$1,630,741	\$5,180,741

THE FIRST NATIONAL BANK

OF HOUSTON, TEXAS

Capital, \$1,000,000.00
 Surplus Fund and Undivided Profits, 400,000.00

Offers to Banks and Bankers Facilities Based on the Record of HALF A CENTURY'S BUSINESS

Recent growth and present rapid development of the First National Bank and Houston as a Financial Center indicated by this Statement of Deposits of this Bank, as shown by reports to the National Examiner:

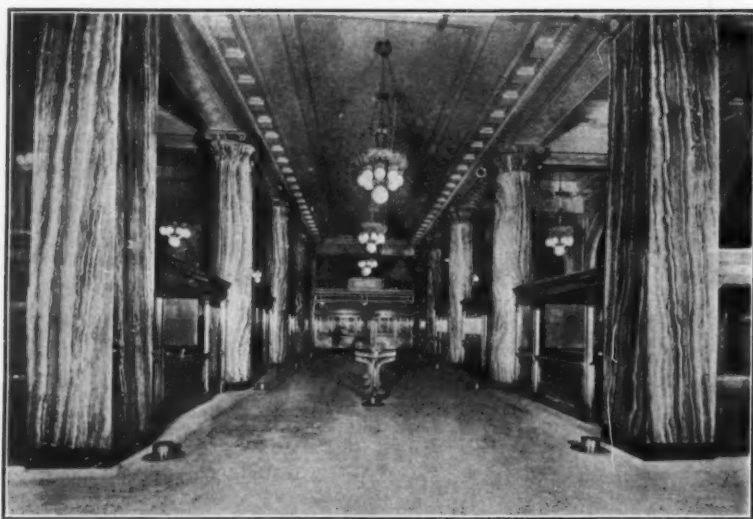
September 1, 1909, \$4,764,967.00
 September 1, 1910, 6,421,938.00
 January 7, 1911, 7,953,096.00
 March 7, 1911, 8,432,907.68
 December 7, 1911, 9,222,433.00

OFFICERS

O. L. COCHRAN, President H. R. ELDRIDGE, Second Vice-President F. E. RUSSELL, Asst. Cashier W. E. HERTFORD, Asst. Cashier
 J. T. SCOTT, First Vice-President W. S. COCHRAN, Cashier GEO. J. TIMMONS, Asst. Cashier J. L. RUSSELL, Asst. Cashier

DIRECTORS

O. L. Cochran W. S. Cochran J. T. Scott E. A. Peden H. R. Eldridge W. H. Kirkland



Interior View of the Union National Bank, Houston, Texas

The Union National Bank

of Houston, Texas

Capital, \$1,000,000.00

Officers

J. S. RICE, President
 T. C. DUNN, Vice-President
 OSCAR WELLS, Vice-President
 GEO. HAMMAN, Vice-President
 W. T. CARTER, Vice-President
 JESSE H. JONES, Vice-President

WE are thoroughly equipped to handle your banking business. We invite the accounts of banks and individuals, promising prompt and efficient service. Collections given special attention.

DIRECTORS

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 R. H. Baker W. T. Carter Geo. Hamman Jonathan Lane
 Thos. H. Ball W. F. N. Davis Bryan Heard Abe M. Levy

J. W. Link
 Arch McDonald
 C. L. Neuhaus

W. O. Neuhaus
 C. G. Pillot
 J. S. Rice

W. M. Rice
 J. W. Robins
 J. M. Rockwell

J. O. Ross
 J. R. Stuart
 J. J. Sweeney

Oscar Wells

Officers

ABE M. LEVY, Vice-President
 C. G. PILLOT, Vice-President
 J. M. ROCKWELL, Vice-President
 DE WITT C. DUNN, Cashier
 D. W. COOLEY, Asst. Cashier
 H. B. FINCH, Asst. Cashier

BANKERS TRUST COMPANY

Capital
\$2,000,000.00

HOUSTON, TEXAS

Surplus
\$500,000.00

"The Largest Financial Institution in the State"

BANKING DEPARTMENT

Makes a specialty of the purchase and sale of Real Estate Mortgages. These are bought primarily for the Company's investment; but are offered in coupon bond form, bearing 7% semi-annual interest; both principal and interest guaranteed by the Company.
5% on Time Deposits.

BOND DEPARTMENT

Buys and sells high-grade Municipal, Public Service and Industrial Bonds. Entire issues of County Drainage Bonds purchased. Commercial paper bought, sold and registered.

Trust Department transacts all business of a fiduciary character.

REAL ESTATE DEPARTMENT

The Real Estate Officer is especially competent to make appraisals throughout the South-west.

This Department has for sale Gulf Coast lands in large, or ten acre tracts; and manages business or residence property in and about Houston.

OFFICERS

JESSE H. JONES, Chairman of Board

J. S. RICE, President
TOM M. TAYLOR, Vice President
N. E. MEADOR, Vice President
C. M. MALONE, Secretary
P. S. DURHAM, Asst. Secretary

F. J. HEYNE, Cashier and Treasurer
BURKE BAKER, Bond Officer
WM. MALONE, Real Estate Officer
E. L. CRAIN, Asst. Real Estate Officer
ANDREWS, BALL & STREETMAN, Counsel

A Clearing House for the Best Securities

THE TEXAS LOAN & GUARANTY CO.

HOUSTON, TEXAS

ARCH MACDONALD, President

C. C. BEAVENS, Secy.-Treas

Authorized Capital Stock, \$500,000

This Company has well-secured Real Estate Notes, bought primarily for its own investment, that are offered to net the purchaser 6 per cent.

DIRECTORS

M. E. FOSTER
R. D. McDONALD

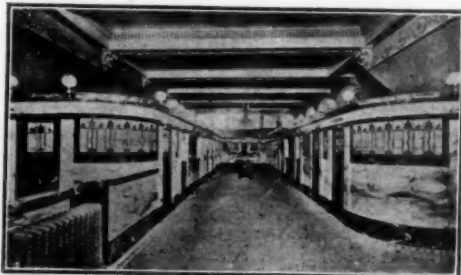
A. W. GARDINER
R. T. CLARK

R. S. STERLING
D. F. BURKS

JESSE H. JONES
ARCH MacDONALD

The American Trust Company Houston, Texas

Only
Guarantee
Fund
Bank
in Houston



Home of The American Trust Company

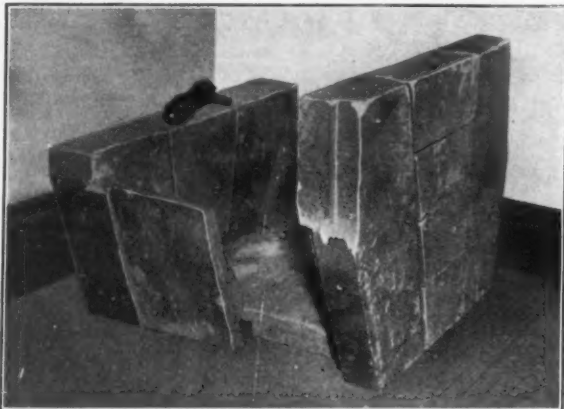
CAPITAL, ONE-HALF MILLION DOLLARS

OFFICERS

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A. R. SHEFFER, Secretary
N. B. SLIGH, Treasurer
JOHN H. KIRBY, Vice-President
J. D. HEFLEY, Cameron, Vice-Pres.
Dr. E. W. BROWN, Orange, Vice-President
M. P. GEISELMAN, Vice-President

THE Directorate of this Strong and Essential Trust Company opens its doors to all Texas. The Directors represent Millions. The Officers are old in Experience. Wealth and Ability stand for Success and Safety. Texas needs this Company.

Locomotive Furnaces



Crude Oil Burners

Clay Products

Interlocking Fire-block Lining for Fire Pans of Oil-Burning Locomotives. Highest Quality and Efficiency. Standard on Trinity & Brazos Valley Railway. In use on five roads. Note report below by J. D. Maupin, Superintendent of Motive Power for the Trinity and Brazos Valley Railroad Company:

"The fire-brick furnished us by Vandaveer-Stoy have reduced our brick trouble at least 80 per cent. We experience absolutely no trouble from the brick falling down in the fire-box, and when once placed it remains in that position until burned out. In case this brick is built to suit the pan, it is absolutely impossible for the brick to fall down. In addition to this, they make a much closer and smoother arch than any brick we have ever used. I recall one instance where we ran an arch in Engine 42 for four months without the removal of a brick. They do not require but about one-third as much fire-clay in placing them in the boxes as is necessary with the ordinary brick, and we can install a set of them in a ten-foot fire-box in one and one-half hours; with the old style it required from four to six hours."

J. D. MAUPIN, S. M. P.

T. & B. V. R. R. Company, Teague, Texas.

Prints of Crude Oil Burner and Pan Sent on Request We Guarantee a Saving in Maintenance of Fire Pans

VANDAVEER-STOY

316 Chronicle Building

HOUSTON, TEXAS

THE MODERN METHOD

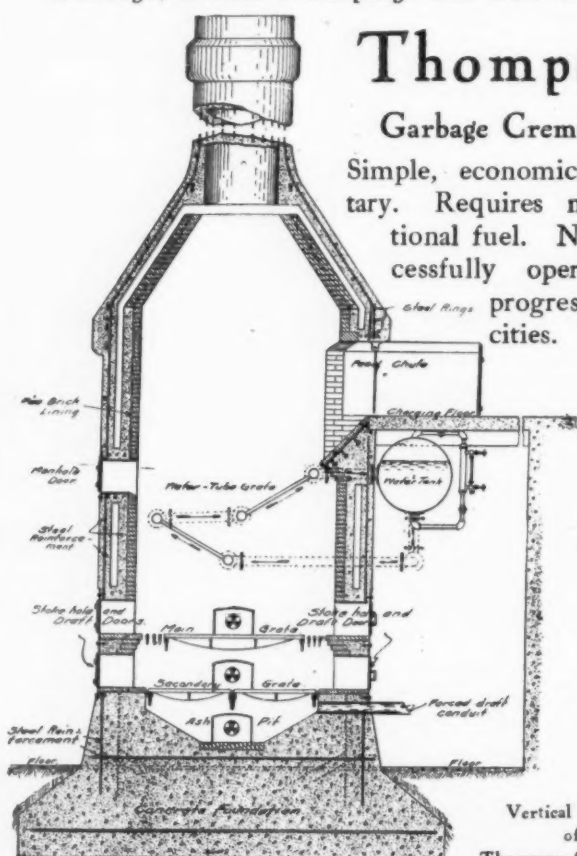
OF DISPOSING OF

Garbage, Street Sweepings and All Refuse

Thompson

Garbage Crematory

Simple, economical, sanitary. Requires no additional fuel. Now successfully operated in progressive cities.



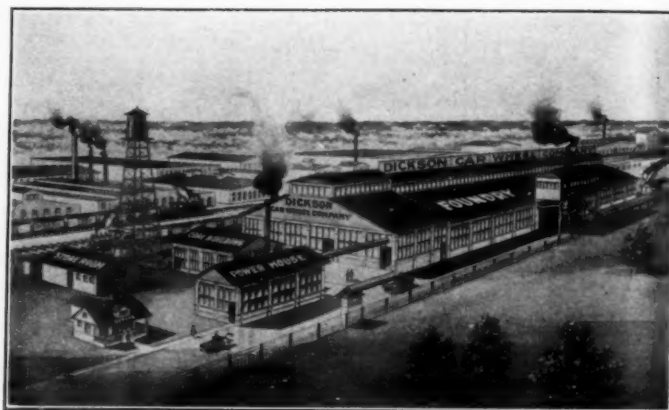
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No.
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Specialty Engineering Co., Houston, Tex.

DICKSON

CAR WHEEL COMPANY

HOUSTON, TEXAS



DAILY CAPACITY
400 WHEELS

THE MOST MODERN INDUSTRIAL PLANT
IN TEXAS OR THE SOUTH

MADE IN TEXAS

The Only Rolling Mill
in the Southwest

Bar Iron, Concrete Bars, Track Spikes, Track Bolts,
Machine Bolts, Carriage Bolts, Nuts and Washers

Keep Southwestern Money in the Southwest.

We are entitled to your business and we want it.

TEXAS ROLLING MILL COMPANY, FORT WORTH, TEXAS

A Home by the Seaside for You

At Beautiful Bay Shore Park

Destined to be the Greatest Winter Resort on the Texas Coast



BAY SHORE PARK is situated twenty miles southeast of the city of Houston. The Southern Pacific Railway crosses the property and one of the finest Shell Boulevards in the South leads from Houston directly to Bay Shore Park. Arrangements have been practically completed to build an Interurban line from Houston to the Park to supplement the excellent transportation service which the Southern Pacific already affords. Plans are under way for the building of a splendid hotel to cost in the neighborhood of a million dollars.

BAY SHORE PARK

has a frontage of four thousand feet on Trinity Bay, one of the most beautiful bodies of salt water on the coast. This resort is land-locked and is protected in every way. A large portion of the six hundred acres is covered with magnificent natural forest trees and the property is well drained, the bay front having an elevation of from twenty to twenty-five feet above the sea. A beautiful macadamized driveway will be made along the shore line, which serves the double purpose of creating a splendid pleasure drive and leaving an unobstructed view of the bay, which is eighteen miles wide at this point.

THIS WILL BE THE LEADING RESORT OF THE HOUSTON-GALVESTON DISTRICT

which is the center of the whole Southwest for tourists and those who come from the North and East seeking winter homes. It is estimated that a quarter of a million tourists and health and pleasure seekers visit this locality annually. Many of these will be attracted by the many advantages of Bay Shore Park and its wonderful natural beauty, and will make homes here.

HOMESITES WILL BE IN GREAT DEMAND AT THIS RESORT

for summer and winter homes, as the mild winter climate and cool Gulf breeze in summer combine to make this an all-the-year-round resort and a most delightful place of residence the whole year.

HOMESITES THAT SELL NOW AT \$5 TO \$7.50 PER FRONT FOOT

will be worth ten to twenty times as much in a few years. The wonderful growth of the Houston-Galveston district in a commercial way and the vast army of people who are coming to this section to make homes and engage in business will cause an enormous increase in values here. Those who buy now, while the prices are nominal, will reap the benefit of this great advance just as the farsighted investors did in the Los Angeles district of California.

THOSE WHO DESIRE WINTER HOMES

in the most delightful climate in the United States can secure them now at BAY SHORE PARK at prices within the reach of people of most modest means. By making a purchase now at the opening prices you will take advantage of the opportunity to get a home at the seashore, near these great cities, with their business openings, that will never come again, as the Houston-Galveston District is the last to be opened up in the country where desirable waterfront property in a suburban location is to be had.

These homesites are sold on easy terms if desired.

We also handle all kinds of Texas raw and improved lands, particularly corn, cotton and potato lands.

Write today for illustrated literature and full particulars.

BAY SHORE HOMESITE COMPANY

THOMAS A. SCOTT, President

1106 Scalan Building

HOUSTON, TEXAS

Galveston, Texas

The City of Commerce

The Second Largest Port of America

Cheap Water Rates, Fuel and Ideal Laboring Conditions, make
Galveston the Practical Place for

Manufactures, Freight Concentration, Exports
Importation, Freight Distribution

58 Lines of Steamships

For Further Particulars, Address Galveston Commercial Association



CORPUS CHRISTI



Within a radius of 50 miles of CORPUS CHRISTI 65 of these giants of Progress are at work day and night, turning the grazing lands of yesterday into farms of today. Farms that will produce in crops as many dollars per acre as any in America which

MEANS

MORE Cotton, corn, forage crops, early vegetables (the earliest in the United States), fruit, produce; in fact everything that grows in, on or from the soil—which means more people, more business and prosperity for the city that is the trading center for that region.

CORPUS CHRISTI IS THAT CITY

Corpus Christi
is the
Most Ideal Natural
Seashore Resort both
Winter and Summer
in America.

Its Advantages are
being developed



This Hotel
and
Others now
being built

TO THE FARMER we say
TO THE MERCHANT we say

TO THE MANUFACTURER we say
TO THE RESORT SEEKER we say

INVESTIGATE

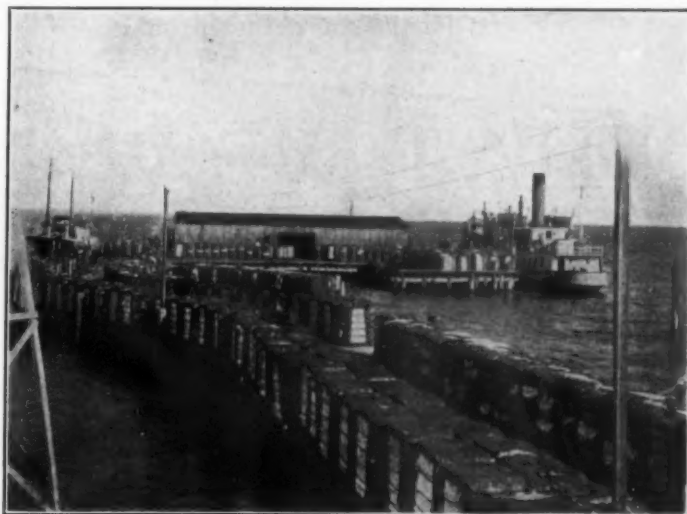
Lands the best in the world. Most healthful and delightful climate on earth. Resort Features unexcelled. Water Transportation Facilities being improved by the Government. Municipal Wharf Building. Sewerage and Water System.

Street Cars and all the accessories of a modern city.

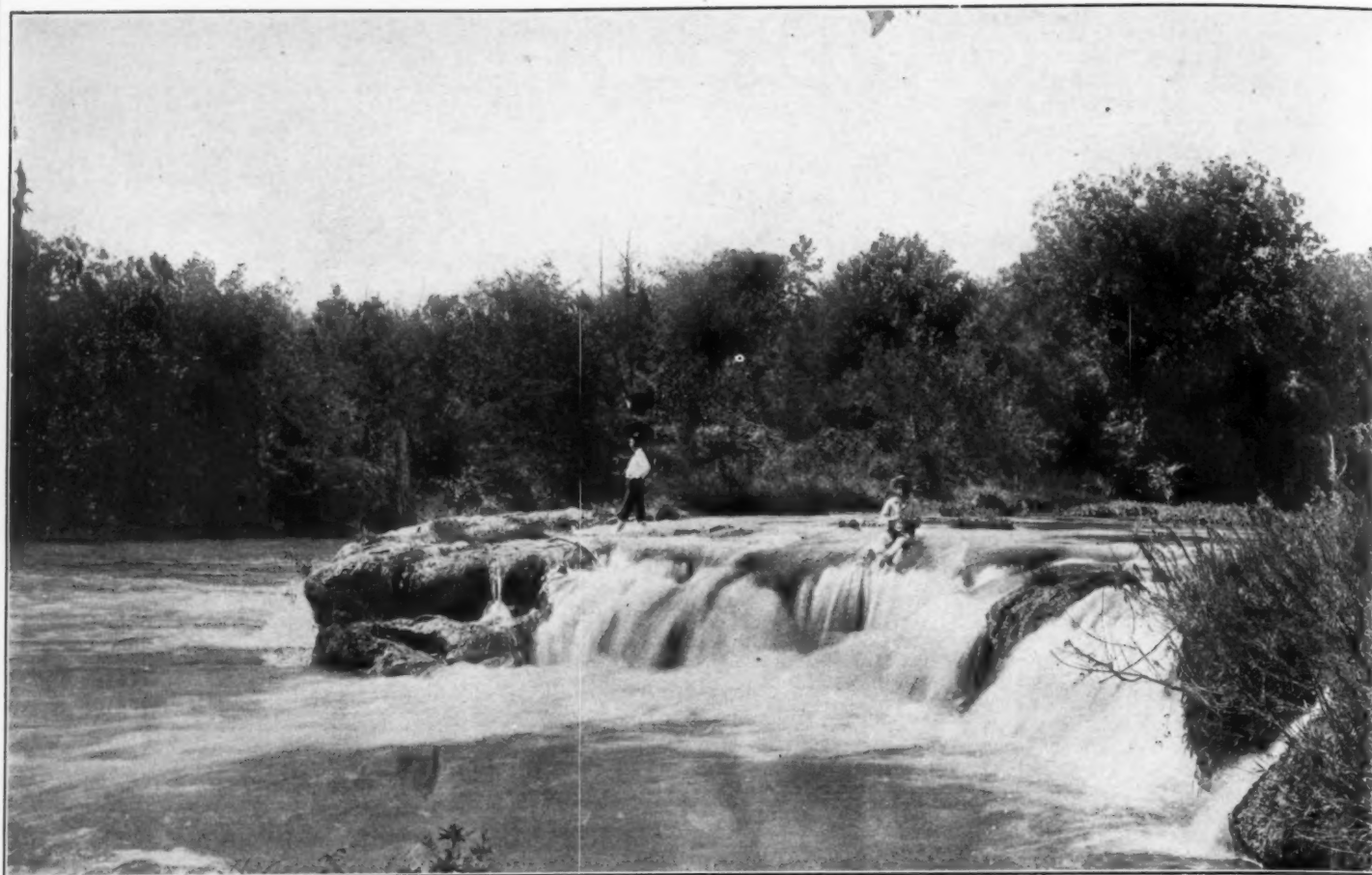
A Future Great City surrounded by a Future Great Farming Country.

For further information address

Corpus Christi Commercial Club



CORPUS CHRISTI, TEXAS



GUADALUPE COUNTY, TEXAS

WHAT WE HAVE

The Guadalupe River is the best power stream in Texas. (Ext. Bulletin U. S. No. 99, Page 336.) The flow is minimum 350, maximum 400 second feet, and the fall through the county, 200 feet. To this date practically undeveloped; 35,000 bales of cotton raised annually in county; densely settled, Germans principally; very low tax rate; near Mexican border; labor very cheap; population friendly to capital.

WHAT WE WANT

Cotton mill or any other industry using power. We have a town of 4000 people. The best town on S. P. between Houston and El Paso, barring San Antonio. This power lies at San Antonio's door, being only 30 miles distant. \$3,000,000 can be safely invested in power development and industries.

J. M. ABBOTT

Ad. Secretary Commercial Club
SEGUIN, TEXAS.

BASTROP, TEXAS

In the fertile Colorado River Valley are the finest and most productive irrigable lands on earth. Can be bought cheaper now than lands of like value elsewhere.

Five thousand acres in Clay Deposits underlaid with Lignite Coal on M. K. & T., and within the immediate vicinity of the city. Has fine commercial value, and suitable for the manufacture of fine "Face Brick."

COMMUNICATE WITH

BASTROP COMMERCIAL CLUB

BASTROP, TEXAS

Own Your Home!

- ¶ The National Building & Investment Company has devised a system by which you can make monthly payments on a home for less than paying rent. Every monthly payment made reduces the principal until you have paid in full for the home. No interest, no taxes until you have received deed.
- ¶ Should you die or become permanently disabled, all future payments cease and a warranty deed clear and free of encumbrance is given your family or heirs.
- ¶ Call or write for booklet explaining in detail the **home certificate** plan for building homes on monthly payments of 1¢ per month.

**AGENTS WANTED
EVERYWHERE**

**The National Building & Investment
Company**

Incorporated Under the Laws of the State of Texas

807-819 Gunter Building

SAN ANTONIO, TEXAS

LAND

Has always been humanity's perfect ideal of that which is immovable, indestructible and imperishable—no security devised by man equals the properly placed farm mortgage.

Safety and Profit in Farm Mortgages

The president of one of the soundest, most conservative and prosperous life insurance companies in the country recently stated that:

"During the panic in the latter part of 1907 the only elastic or vital form of asset was the farm mortgage, the experience of that year being that the farmers everywhere availed themselves very generally of their payment option to cut down the principal of their loans."—*Rand-McNally Bankers' Monthly*.

Chicago business men in report of their Texas tour say:—"We saw for ourselves in North Central Texas literally thousands of acres of fertile land in the so-called Black-Waxy Belt, which is one of the most fertile spots of the earth."—*Chicago Commerce*, May 5, 1911.

Texas Farm Mortgages are Excelled by None

For adequate safety and security with substantial dividend yield. For more than fifteen years we have been making farm loans in North Central Texas, and have never had a suit or foreclosure, and have now no past interest due, which is certainly evidence of our ability and success in safeguarding the interests of our clients.

The Most Conservative

Life Insurance Companies in the Union invest in North Central Texas Farm Mortgages.

Write for booklet showing the REASON our farm mortgages are safer than bonds, as well as yield larger dividends.

A. Y. CREAGER CO., Farm Loans
SHERMAN, TEXAS.

BEEVILLE

BEE COUNTY, TEXAS

"The Land Where the Oranges Grow"



The above cut shows the Orange Groves and Olives at the Beeville State Experimental Farm after two severe winters.

Beeville is the County Seat of Bee County, having a population of about 4500, and located about 50 miles from the coast in the fertile chocolate and black loam belt with a clay subsoil.

We Want Industrious Farmers to Locate in the Immediate Vicinity of Beeville

There are fifty, five to twenty acre tracts within a radius of two miles of the Bee County Courthouse. This land is adapted to raising of truck, fruit, and all semi-tropical plants.

Our trucking consists of the raising of potatoes, radishes, beets, cauliflower, lettuce, onions, asparagus, turnips, beans, peas, peanuts, cantaloupes, watermelons, etc. Our lands are also adapted to the growing of all kinds of fruits, to wit: Oranges, peaches, pears, olives, grapes, plums, pecans, and everything with the exception of apples and cherries. The delightful climate and rainfall averaging about 35 inches per annum insures a good yield of all our crops. Our summers are very pleasant and a great deal milder than those of the northern and central United States. Our location is near enough to the coast for the gulf breeze to produce coolness and yet far enough away to be free from moisture, and this moderates our climate.

There are about 50,000 acres of unimproved land on the market in Bee County.

For further information address the

YOUNG MEN'S PROGRESSIVE LEAGUE
BEEVILLE, TEXAS

ROCKPORT THE SEATTLE OF THE SOUTH THE NEW YORK OF THE SOUTH

This is what Rockport will be.

There is no harbor anywhere in the world without an accompanying harbor city. Our harbor—Port Aransas—is where nature has planted a bulwark in the shape of St. Joseph and Mustang Island, with Harbor Island in front of it. IT IS THE PLACE OF LEAST RESISTANCE, WHERE RAIL AND WATER MEET TO HANDLE THE COMMERCE OF THE NEW TEXAS EMPIRE.

Cheap fuel and cheap water and rail transportation, with products and raw material at our door, will make Rockport the largest manufacturing city in the South. Look at the map! Mexico within a stone's throw, and the nearest port to the Panama Canal. Have you business judgment enough to know what that means? If so, you should know that there is no place on earth AT THE PRESENT TIME where you could invest a small amount of money which would give you greater returns than in Rockport, Texas.

Briefly: A double land-locked harbor. Eighty square miles of deep water, or six times more than Galveston. Large enough to harbor the entire American fleet. Six hundred miles nearer Panama than any other naval base.

Rockport stands without the shadow of a rival, and is destined to become the largest city in the South. The question of her future is settled for all time to come.

This new harbor will be open to the commerce of the world by August, 1912. Railroads are now fighting for positions, and four or five more will hit the harbor in time to handle this year's products, as the second largest steamship company in the world has closed negotiations to ply between Rockport and European ports.

Rockport is today a city backed by all the potent factors of commerce and finance that are essential to metropolitan growth. What will she be tomorrow?

FOR FURTHER INFORMATION ADDRESS

ROCKPORT COMMERCIAL CLUB - ROCKPORT, TEXAS



SAN ANTONIO OFFERS

Industrial Openings

- A Cracker Factory - No factory in radius of 300 miles; a splendid field ready to be occupied.
- Knitting Mill }
Hosiery Mill } - About 7,000,000 pounds of wool marketed annually in the San Antonio country. No mills of this sort in a radius of 750 miles.
- Woolen Mill }
- Cotton Mill - - - Abundance of raw material, conditions of climate and labor favorable.
- Canning Factory - The truck gardens and fruit orchards of the San Antonio country can supply enough to feed the whole Southwest and Mexico. Why import our food and canned vegetables from California and Maryland as we now do.
- Fertilizer Factory - Georgia last year used nearly a million tons of fertilizer; Texas less than 50,000 tons. Texas must learn that fertilizing pays. There are only two fertilizer factories in this State. Here is a good business opening.
- Wall Paper Factory - San Antonio destroys each month over 300,000 pounds of waste paper, and pays money to get it done. This raw material can be had at nominal cost and worked over into cheap grades of wall paper and pasteboard.

These are only a few of the industrial openings, full details of which may be had from the Chamber of Commerce. San Antonio is not making a practice of offering bonuses nor of furnishing capital for unknown strangers to do business on, but the bona-fide factory man will get assistance and a warm welcome in San Antonio.

SPECIAL INFORMATION

For winter visitors wishing to know about climate and accommodations.

For farmers and homeseekers wishing to know agricultural opportunities of this marvelous country.

ADDRESS

**THE CHAMBER OF COMMERCE
SAN ANTONIO, TEXAS**

Homeseekers and Investors

Attention is invited to our Property at ROCKPORT, and on LIVE OAK PENINSULA, ARANSAS COUNTY, TEXAS.

Buy a LOT or LOT and FARM TRACT for \$150, on which to build a HOME in the heart of the FRUIT and VEGETABLE section of South Texas, at a Summer and Winter Resort, where you can enjoy as fine Climate, Driving, Boating, Bathing, Fishing and Hunting as can be found anywhere.

Our property lies at the door of the GREAT HARBOR which the UNITED STATES GOVERNMENT is constructing at PORT ARANSAS.

When the PANAMA CANAL and the RAILROADS, now projected, are completed, ROCKPORT will be the best place to live, and the Greatest Commercial City on the TEXAS COAST.

GOOD WATER is obtainable from WELLS in quantities sufficient for TRUCK FARMING purposes, anywhere on our property, at a depth from TEN to TWENTY feet, at a cost not exceeding \$20, including pump.

IT WILL PAY TO INVEST THERE.

Write for FREE ILLUSTRATED BOOKLET.

**GULF COAST IMMIGRATION CO.
Bedell Building. SAN ANTONIO, TEXAS**



Bay Front at Aransas Pass, Showing Railroad Grade to the Harbor.

Uncle Sam's New Deep Water Port at Aransas Pass, Texas NOW BEING DEVELOPED

The Only Land-Locked Harbor on the Gulf Coast

Improvements of the Harbor

The U. S. Government has already expended about one and one-half millions of dollars on this harbor, besides about one-half million which was expended by private parties. Two substantial jetties have been constructed about 1200 feet apart; one running out from St. Joseph's Island into the Gulf and the other extending from Mustang Island into the Gulf. The depth of water on the bar has been increased from 8 feet to 23 feet. It is only 1900 feet from the end of the South jetty to 30 feet of water in the Gulf.

The Government contractor is now at work constructing a dike up the center of St. Joseph's Island to protect the harbor. This dike is to be 10,000 feet long, 8 feet high and 14 feet wide on the top. The dike will be completed just as rapidly as possible. The harbor has been located by the Government between Harbor and St. Joseph's Islands. The Government has let the contract to the Bowers Southern Dredging Co. to dredge this harbor 20 feet deep, 1200 feet wide and 8400 feet in length. This work will be rushed to completion.

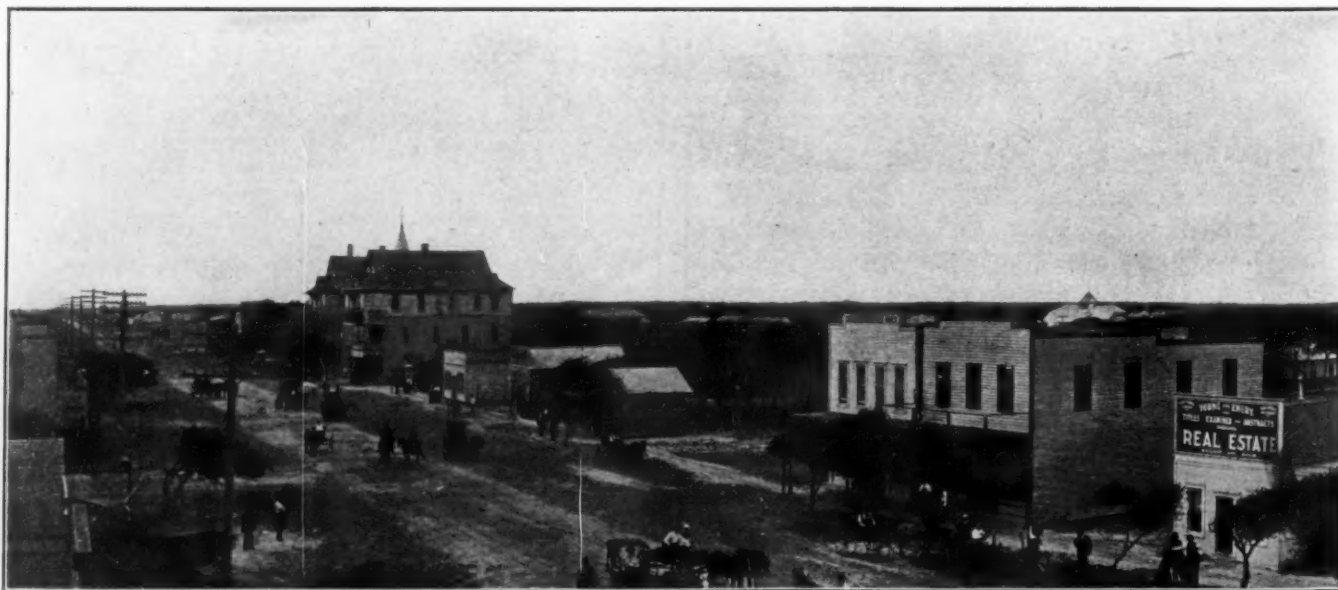
The United States Dredge *Comstock* is now engaged in widening the channel in the pass between the jetties and deepening it to twenty-five feet.

The City of Aransas Pass is on the nearest mainland to the harbor, being less than six miles, and is one of the best locations on the Texas coast for a great city. There are three tiers of islands between this location and the Gulf, which gives it perfect protection from all Gulf storms and ocean waves. The land fronts on Red Fish Bay and rises gradually from the water's edge to a height of at least twenty-five feet, giving sufficient fall to insure perfect drainage. This town is beautifully laid out with broad streets and avenues. There are many live oak and sweet bay trees on the townsite, which are evergreen and make beautiful shade trees, when properly cared for. An abundance of good fresh water can be obtained at a depth of from 15 to 20 feet by driving wells. There are no fresh water streams near this location, and therefore there is no malaria. The thermometer rarely ever registers more than 92 degrees in the shade, the heat being tempered by a cool breeze which blows almost continually from the Gulf during the summer. The winters are exceedingly mild.

Aransas Pass is nearer the Panama Canal by 190 miles, according to the international shipping channel charts, than any other seaport in the United States.

For any information, address

SECRETARY ARANSAS PASS COMMERCIAL CLUB, ARANSAS PASS, TEXAS



Busy Street Scene.

Port Aransas, Texas

THE NATION'S
NEWEST DEEP
WATER PORT.

THE SOUTH'S
COMING
CONEY ISLAND.

THE YOUNGEST
INCORPORATED
TOWN IN TEXAS

On the northern extremity of Mustang Island, bounded on three sides by the DEEP WATER HARBOR, the PORT ARANSAS PASS and the GULF OF MEXICO, is situated the thriving little city of Port Aransas, at the most vital point, the center of gravity for shipping to and from the southwest; in fact, the POINT OF EXCHANGE, toward which every project of the great Southwest is moving, surging, pulsating and puffing in an eager effort to reach her first. She is ambitious to accomplish everything that is expected of her in playing the title roll in the great drama about to be enacted, "The Fight for Commercial Supremacy of the Southern World." In her infancy she is being strongly supported by the State and the conquering hand of Uncle Sam. Unable to develop her natural resources and advantages, the United States Government has already spent more than \$2,000,000 within her very Corporate Limits, and millions more will come as it is needed, until we will have one of the finest Harbors in the world. Not only through the locating of the great Government Harbor at our very door is the future greatness of Port Aransas assured, but she has a combination of resort features that are ideal, and in time will make her the Coney Island of the South. She is the rendezvous of the famous Tarpon Club, which numbers among its members many of America's and England's foremost citizens. Fishing and hunting in the vicinity of Port Aransas cannot be discounted in the entire country. Fairly teeming the waters of the Pass and Gulf alongside the jetties are to be found hundreds of varieties of fish, including the famous Tarpon, King Fish, Jackfish, Spanish Mackerel, Dolphin, Pompano, Redfish, Trout, Flounder, Red Snapper, Pike, Shark, Sting Rays, Devil Fish and a multitude of others, edible and otherwise, comprising a list to suit the most blasé wielder of rod and reel. Geese ducks and many other varieties of game birds abound in the nearby waters.

A wave-washed beach, second not even to the famous Ormond-Daytona Beach, stretches from Port Aransas 20 miles down the Gulf side of Mustang Island, and is ideal for the automobile enthusiast.

To the surf bather Port Aransas' splendid beach and tepid waters holds greater charms than even Atlantic City. Even in February surf bathers are no uncommon sight on Port Aransas Beach. Our climate is ideal in summer, delightful in winter. Average temperature in summer, 84°; average winter temperature, 62°. Absolutely NO MOSQUITOES or MALARIA.

Port Aransas is reached daily by three passenger boat lines, is incorporated under the Commission Form of Government, has a LIVE newspaper and a bustling Commercial Club, which is capturing every point of vantage in her march cityward. Splendid openings for live business men.

For further information address the President or Secretary of the

Commercial Club, Port Aransas, Tex.

United States Bond and Mortgage Company

Capital Paid in \$200,000.00

Municipal Bonds and Real Estate Mortgages

Home Office

1101-1103 MAIN ST., DALLAS, TEXAS

Branch Offices

Oklahoma City, Okla.
Vicksburg, Miss

Temple, Texas
Hillsboro, Texas

MUNICIPAL BONDS. We buy and sell bonds issued by Counties and Cities of Texas, Oklahoma and other adjacent States.

REAL ESTATE MORTGAGES. Our loans are made in Texas on farms in the famous Black Waxy Belt; on stock farms in the middle West; on desirable ranches, and on improved business and residence property in the larger cities. We also make farm loans in Oklahoma, and on city property in Oklahoma City and Muskogee; also on plantations in the Yazoo Delta of Mississippi.

We attend to the collection and remittance of interest and principal; to the payment of taxes by the borrower and to the keeping of the insurance, if any, in force in good companies, during the life of the loan, without charge.

We are in position to promptly fill orders for mortgages in any amount from \$1,000.00 to \$250,000.00 and will be pleased to furnish list with detailed information. We will, on request, mail our monthly Investment Bulletin and our special pamphlet on City Loans.

OFFICERS

WM. G. BREG, President

H. A. KAHLER, Vice-President

ALEX. SANGER, Vice-President

S. J. HAY, Vice-President

F. O. KETCHAM, Secretary

H. D. ARDREY, Vice-President

T. F. SHERWOOD, Asst. Secretary

Your Opportunity to Lay a Foundation for a Fortune

The Building of a Great Commercial City is Assured at

ARANSAS PASS

The same conditions exist here today as on the Pacific Coast a few years ago

CONSULT YOUR MAP

600 miles from Galveston, Texas, to Tampico, Mexico.

"The only point where a new safe harbor can be opened in this large area of 600 miles, is Aransas Pass"

We have for sale a limited number of business lots on bay front. (Original Town Site) between the two terminal railroads and the bay. So situated that it must become the cream of the wholesale district. The time is not far distant when this property will be selling per front foot at big figures. You can buy now on terms of \$10 cash and \$10 per month. No interest or taxes until paid out. Remember the number is limited, and when these are sold we can not duplicate this proposition. Write for literature and map at once and secure one of these choice lots now.

Aransas Pass Realty Co.

Aransas Pass, Texas

Dalworth, Texas

"The town that was started right"
Built for factories and factory employees.

The logical factory location of the great Southwest.

In the heart of the famous Black Land Belt of Texas, and halfway between two important cities, Dallas and Ft. Worth.

Furniture and Mattress Factory and Cracker Factory already here.

Free Sites

Free Water

Cheap Natural Gas

Excellent Railroad Facilities

We own hundreds of choice lots and can build for your employees. No other town in Texas is so well fitted to care for the factory worker. Half-hour Interurban Car Service.

Write us for interesting folder and any desired information. Address

The Dalworth Company

Grand Prairie P. O., Texas

Largest Bank in Texas

ROYAL A. FERRIS, President
 C. C. SLAUGHTER, Vice-President JOHN N. SIMPSON, Vice-President
 E. M. REARDON, Vice-President A. V. LANE, Vice-President
 E. J. GANNON, Vice-President NATHAN ADAMS, Cashier

American Exchange National Bank DALLAS, TEXAS

Capital, Surplus and Profits . . .	\$2,200,000
Resources	12,000,000

Especially well equipped to handle business of Southern Manufacturers, Corporations and Individuals. We invite a call or correspondence.

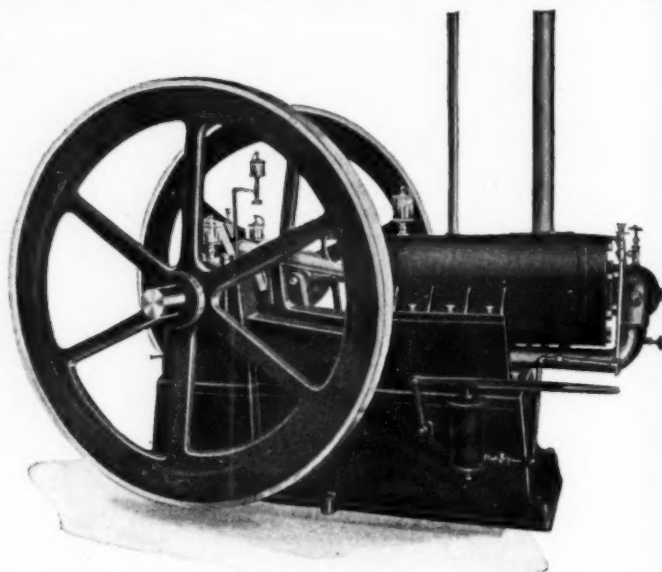
1873—39 YEARS OF SUCCESS—1912

A. L. GOOCH

Austin, Texas

Cut Stone Contractor

Specializing Cedar Park Limestone
 the successor to Caen Stone, also
 Texas Red and Gray Granite



7 H. P. to 80 H. P.

The Largest Gasoline Engine Factory in the South

ALSO
 Manufacturers of Irrigation Pumps
 STRICTLY
 High-Grade Guaranteed Machinery

Tips Foundry & Machine Co.
 AUSTIN, TEXAS

WISH to correspond with parties able to finance development of water on 16,000 acres Bermuda Onion, Alfalfa and Truck Land, Nueces Valley of Texas, exceptional in quantity of water and quality of soil, large profits when developed, or will contract to responsible parties at net price to me; probable cost of development \$100,000. Have three railroads.

G. DENTON, OWNER, MOORE BUILDING, SAN ANTONIO, TEXAS

WE CAST EVERY DAY

PATTERN SHOP IN CONNECTION

Enterprise Iron Works

HORRELL BROS., Proprietors

Manufacturers of Iron Castings of All Kinds

515 East Front Street, Fort Worth, Texas

Southwestern Mechanical Company

Manufacturers, Engineers and Agents

FORT WORTH, TEXAS

STRUCTURAL IRON and STEEL BUILDING SPECIALTIES

SHEET STEEL
 AND
 METAL WORK

MACHINE
 AND
 FORGE WORK

We carry in stock a full line of structural shapes, plates and bars for immediate delivery which we will cut to desired lengths. We also have especial facilities for the fabrication of structural steel to plans and specifications.

A Different Kind of Investment Offered for Your Consideration

Ample endorsed and guaranteed. A home and farm, the latter carried for you while paying easy monthly installments. No interest, taxes or brokerage fees to pay.

**Proven Citrus Fruit and Truck Lands can be
 Purchased Cheap and on Favorable
 Terms at**

Tarpon Springs, Fla.

Hillsboro county and Lake Butler region in Florida—on the West coast on the Gulf of Mexico—with its elevation and rolling hills, is especially suited for fruits—grape-fruit, oranges, grapes, dates, figs, bananas, peaches and other fruits, as well as vegetables, potatoes, corn, beans, peanuts and all the varieties, as well as corn and alfalfa and staple crops.

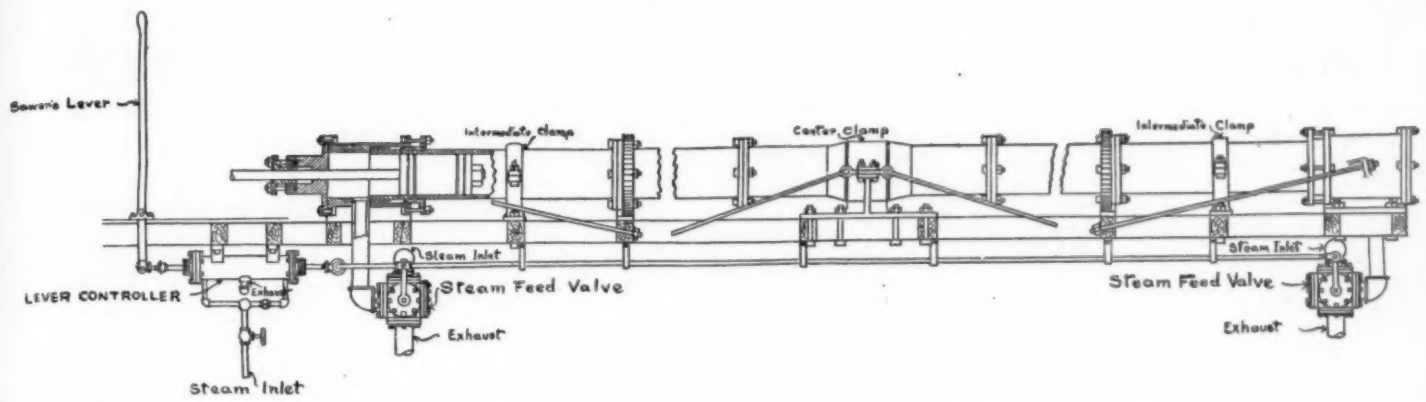
The men composing this Company are all active Tampa business men, for many years identified with the financial and manufacturing interests of this section, whose aim is to make this development beneficial to Florida, profitable to the purchaser and creditable to themselves.

The spirit behind the management is development—not speculation.

REFERENCES—Board of Trade, Tarpon Springs, Fla.;
 Board of Trade, Tampa, Fla.; banks and any business
 man at Tampa or Tarpon Springs.

Write for booklet and full details as to land and terms.

Tampa & Tarpon Springs Land Co.
 TAMPA, FLA.



Office of
CARTER LUMBER CO.
The Beaumont Iron Works Co.,
Beaumont, Texas

Baber, Texas, 10-12-11

Gentlemen:—

Replying to your favor of recent date inquiring as to success we are having with the Rigsby valve, beg to state that this valve has been in use in our mill since September the first, and we are pleased to advise that we have found it very satisfactory. It is simple in construction, conserves steam, and we find it the most sensitive valve we have ever used.

We will be glad to answer any inquiries in regard to this valve that you may have occasion to refer to us.

Yours very truly,
CARTER LUMBER CO.,
Signed, E. T. HICKMAN, Sup't.

Office of
MILLER-LINK LUMBER CO.
Beaumont Iron Works Co.,
Beaumont, Texas

Orange, Texas, July 15, 1911

Gentlemen:—

Confirming telephone conversation between the writer and your Mr. Black yesterday, we desire to say that the 12-inch Revolving Shot Gun Steam Feed which we purchased from you is giving perfect satisfaction. The Gun sets perfectly rigid and steady in the floor, and the trunnion blocks being bolted to the floor joists, there is not the slightest perceptible shifting of the gun. The Stuffing Boxes at either end of the gun fit snug and there is no leaking of steam. One man can revolve the gun with ease.

We desire to extend through you a cordial invitation to any of your customers or prospective customers to visit our mill and see this gun in operation.

With best wishes, we are,
Yours truly,
OSCAR S. TAM, V. P. and G. M.

If you are not using a Revolving Steam Feed, the Rigsby Steam Feed Valve, and Martin Valve Controller, *then we both lose.* Let us send you full particulars.

BEAUMONT IRON WORKS CO., Beaumont, Texas

J. M. ABBOTT, Vice-President

GEO. W. NEWMAN, President

C. W. ABBOTT, Secretary

VINTON PIPE LINE CO.

401-2-3 Pearlstein Building
BEAUMONT, TEXAS

Contracts of Any Size Solicited

Export Business Especially
Solicited

We Pipe and Market
Fuel Oil

Leading Financial Institutions of the South



At the Gateway of the Southwest

This institution offers Efficient Financial and Fiduciary Service through Six Complete Departments.

It is especially equipped to act as Agent in St. Louis and the Southwest.

It acts as Trustee under Mortgages, and as Registrar and Transfer Agent of Bonds and Stocks, and has special facilities for handling Reserve Accounts.

Correspondence invited.

Capital, Surplus and Profits, \$8,500,000

As Firm as Gibraltar's Rock
Stands

The National Mechanics Bank OF BALTIMORE

For more than one hundred years
it has withstood the shock of panics
and all financial troubles and has ac-
cumulated a surplus of \$1,000,000.

*We want your business:
Will you call or write?*

Capital	- - - - -	\$1,000,000
Surplus	- - - - -	\$1,000,000
Deposits Jan. 12th, 1912	- - - - -	\$8,000,000

JOHN B. RAMSAY, President
JAMES SCOTT, Cashier
CHARLES HANN, Ass't Cashier
ROBERT A. WELSH, Ass't Cashier

ANNUAL REPORT OF Central Savings Bank of Baltimore

S. E. Corner Charles and Lexington Streets
BALTIMORE, MARYLAND

AT THE CLOSE OF BUSINESS DECEMBER 31, 1911

Funds on hand December 31, 1910.....	\$9,887,115.92
Received from depositors during 1911.....	3,711,778.48
Received interest and dividends on stocks, bonds, loans, etc., during 1911.....	456,940.63

Total.....\$14,057,835.03

Paid depositors during 1911, including interest.....	\$3,457,963.95
Paid expenses during 1911.....	34,651.46
Paid taxes during 1911.....	26,694.44
Paid premiums, etc., during 1911.....	25,160.73
Funds on hand December 31, 1911.....	10,513,359.45

Total.....\$14,057,835.03

Par Value.	ASSETS.	Ledger Value.	Market Value.
\$500,000	State Bonds.....	\$471,750.00	\$474,075.00
53,000	County Bonds.....	53,000.00	54,012.50
2,076,500	Municipal Bonds.....	2,049,360.00	2,084,800.00
3,102,500	Railroad bonds.....	3,002,640.00	3,115,590.00
634,000	Street Railway Bonds.....	618,000.00	641,350.00
20,000	Water Company Bonds.....	20,000.00	20,500.00
150,000	Gas Company Bonds.....	147,500.00	154,125.00
250,000	Equipment Bonds.....	247,851.25	249,025.00
44,000	Merchants & Miners' Transportation Co. Bonds.....	42,680.00	42,900.00
15,000	Coal Co. Bonds.....	13,950.00	14,100.00
\$6,845,000		\$6,666,731.25	\$6,850,477.50

Mortgage Loans.....	\$2,394,420.00	\$2,394,420.00
Collateral Loans.....	820,783.95	820,783.95
Real Estate—Bank Building.....	200,000.00	200,000.00
Real Estate—No. 5 E. Lexington St.....	34,212.47	34,212.47
Perpetual Insurance Deposits.....	850.00	850.00
Cash on hand and in banks.....	396,361.78	396,361.78
	\$10,513,359.45	\$10,697,105.70

LIABILITIES.		
Due depositors, including 3½ per cent. interest credited December 31, 1911.....	\$9,639,962.28	\$9,639,962.28
Guarantee Fund, as per ledger.....	873,397.17	
Excess of Assets (at market value) over Liabilities.....		1,057,143.42
	\$10,513,359.45	\$10,697,105.70

Accounts open December 31, 1910.....	21,224
Accounts opened during 1911.....	2,331
Accounts closed during 1911.....	1,989
Accounts existing December 31, 1911.....	21,566

ROBERT K. WARING,
President.

J. WILSON COLE,
Treasurer.

State Bank of Maryland

S. W. Cor. Baltimore and Commerce Streets
BALTIMORE, MD.

President

William Woodward Cloud

Vice President

Summerfield Baldwin

Cashier

Henry B. Reinhardt

Directors

Summerfield Baldwin
William D. Gill
Samuel B. Weaver
Joshua S. Rawlings
Dwight W. Williamson

Douglas H. Gordon
Edwin L. Turnbull
Geo. A. Whiting
Henry W. Matthews
R. Miller Arnold

Geo. T. Phillips
S. Fory Laucks
Thomas J. Pyle
D. O'Reardon
Wm. W. Cloud

The Modern Way

We solicit your business in the same manner that you solicit your own, to wit: on the quality, price, terms and conditions of what we have to offer. We ask you to investigate our Terms, Conditions, our facilities for handling your general Banking business and our ability to take care of your requirements.

The Officers of this Bank are always accessible to the smallest as well as the largest business man.

Produce Exchange Branch
17 and 19 East Pratt St.

Highlandtown Branch
3706 Eastern Ave.

SAFE DEPOSIT & TRUST CO. OF BALTIMORE

Capital, Surplus and Profits, - - \$2,800,000

Acts as Trustee, Receiver, Attorney and Agent—being especially organized for careful management and settlement of estates of every description.

Acts as Trustee of Corporation Mortgages, Fiscal Agent for Corporations and Individuals, Transfer Agent and Registrar.

Depository under plans of reorganization.

Securities held for safe keeping for out-of-town Corporations and Persons.

Fireproof building with best equipment for safety of contents—used exclusively by the company.

Safes for rent in its large fire and burglar-proof vaults, with spacious and well-lighted coupon rooms for use of patrons.

DIRECTORS

MICHAEL JENKINS, President

H. WALTERS, Vice-Pres.

JOHN W. MARSHALL, 2d Vice-Pres.

JOHN J. NELLIGAN, 3d Vice-Pres.

WALDO NEWCOMER,

E. H. PERKINS SAM'L M. SHOEMAKER

DOUGLAS H. THOMAS

NORMAN JAMES

BLANCHARD RANDALL

ISAAC M. CATE

ANDREW P. SPAMER, Treasurer

GEO. B. GAMMIE, Asst. Treas.

H. H. M. LEE, Secretary

MARYLAND TRUST COMPANY

N. W. COR. CALVERT AND GERMAN STREETS, BALTIMORE, MD.

Statement of Condition at Close of Business December 30, 1911

<i>Assets</i>		<i>Liabilities and Capital</i>	
Cash on Deposit and in Hand	\$ 273,206.35	Deposits:	
Loans on Collateral:		Individual	\$912,740.75
Demand	\$815,800.00	Banks	99,478.40
Time	81,483.58	Trust Accounts	235,391.08
	897,283.58		\$1,247,610.23
Other Current Assets	91,819.93	Certified Checks	12,250.00
Investments:		Total Liabilities	\$1,259,860.23
Sundry Bonds, Stocks, etc. \$990,134.71		Excess of Assets over Liabilities represented by:	
City of Baltimore 3½% Stock 296,484.00		Undivided Profits	\$ 343,068.34
Maryland Trust Bldg. Co.,		Preferred Capital Stock	500,000.00
entire Bonds and Stocks 550,000.00		Common Capital Stock	1,000,000.00
	1,836,618.71		1,843,068.34
Office Furniture and Fixtures	4,000.00	NOTE:	
Total Assets	\$3,102,928.57	Undivided Profits before Dividend	\$373,068.34
		Less Dividends on Preferred Stock paid during past year	30,000.00
		Balance of Undivided Profits, as above	\$343,068.34
		Total Liabilities and Capital	\$3,102,928.57

Transacts a General Trust and Banking Business.

Interest allowed on Deposit Accounts Subject to Check.

A Legal Depository for Court and Trust Funds.

Safe Deposit Boxes For Rent.

Correspondence and Interviews Invited.

Officers

L. S. ZIMMERMAN, President
OSCAR G. MURRAY, 1st Vice-Pres.
CARROLL VAN NESS, 2d Vice-Pres.
JERVIS SPENCER, Jr., Sec. and Treas.
IVAN SKINNER, { Asst. Secretary
 { Asst. Treasurer

Directors

Joseph I. France Henry C. Matthews
B. Howell Griswold, Jr. J. Barry Mahool
George Garr Henry Oscar G. Murray
A. Barton Hepburn Theodore E. Straus
John T. Hill Arthur G. Wellington
George C. Jenkins Henry B. Wilcox
J. V. McNeal Douglas M. Wylie
L. S. Zimmerman

We have examined the books and accounts of the Maryland Trust Company, and WE HEREBY CERTIFY that the above statement correctly sets forth the Company's condition at the close of business on December 30, 1911.

New York, January 15, 1912.

(Signed) HASKINS & SELLS, Certified Public Accountants.

ESTABLISHED 1835

The Merchants National Bank of Baltimore, Maryland

DOUGLAS H. THOMAS, President

WILLIAM INGLE, Vice-President and Cashier

J. CLEVELAND WANDS, Asst. Cashier

JOHN B. H. DUNN, Asst. Cashier

Capital,	-	-	-	-	-	-	-	-	-	\$ 1,500,000
Surplus and Profits,	-	-	-	-	-	-	-	-	-	1,000,000
Deposits,	-	-	-	-	-	-	-	-	-	12,000,000
Total Assets,	-	-	-	-	-	-	-	-	-	15,000,000

DIRECTORS

DOUGLAS H. THOMAS, President

FRANCIS E. WATERS
Of Surry Lumber Co.

CHAS. A. WEBB
Of A. L. Webb & Sons, Alcohol,
Spirits, Oils and Naval Stores

JOHN S. GITTINGS
Of J. S. Gittings & Co., Bankers

AUSTIN McLANAHAN

Of Alex. Brown & Sons, Bankers

JAMES L. SELLMAN
Of Jas. Bonday, Jr. & Co., Salt, etc.

WILLIAM INGLE, Vice-President

JOHN K. SHAW
Of Shaw Bros., Coal Miners and
Shippers

Accounts of Banks, Bankers, Corporations, Firms and Individuals Solicited

CORRESPONDENCE INVITED

The Savings Bank of Baltimore

STATEMENT JANUARY 1st, 1912

In Conformity with Section 36 of the Banking Law

Funds on hand December 31st, 1910.....\$33,901,320.42
 Received from Depositors during 1911..... 8,060,923.58
 Received interest and dividends on stocks, bonds, loans,
 etc., during 1911..... 1,608,362.34
 Total, \$43,570,606.34

Paid Depositors during 1911, including interest..... \$7,997,584.45
 Paid expenses during 1911..... 63,286.26
 Paid taxes during 1911..... 89,800.00
 Paid premiums, etc., during 1911..... 123,860.91
 Funds on hand December 30th, 1911..... 35,296,074.72
 Total, \$43,570,606.34

ASSETS

(Book Value)

Bonds and stocks owned.....\$32,301,512.77
 Loans on collateral..... 11,000.00
 Loans on mortgages..... 1,966,675.00
 Real Estate (Bank Building)..... 300,000.00
 Other Real Estate owned..... 45,574.27
 Cash on hand and in Banks..... 671,312.68
 Total, \$35,296,074.72

LIABILITIES

Due Depositors.....\$32,773,015.82
 Guarantee Fund..... 1,750,000.00
 Undivided Surplus (chargeable with nine months' ac-
 crued interest on deposits payable April 1st, 1912) .. 773,058.90
 Total, \$35,296,074.72
 Accounts open December 31st, 1910..... 53,629
 Accounts opened during 1911..... 6,569
 Accounts closed during 1911..... 6,176
 Accounts existing December 30th, 1911..... 54,022

DIRECTORS

JAMES A. GARY
 GEORGE C. JENKINS
 DOUGLAS H. THOMAS
 CHARLES C. HOMER
 WILLIAM H. CONKLING
 R. CURZON HOFFMAN

BLANCHARD RANDALL
 HENRY G. HILKEN
 FRANK N. HOEN
 WALDO NEWCOMER
 JOHN B. RAMSAY
 CHARLES A. WEBB

ALEXANDER HARVEY

HENRY B. VOCKE
 HENRY C. MATTHEWS
 GEORGE R. WILLIS
 FREDERICK A. HOFFMAN
 HARRY FAHNESTOCK
 GEORGE A. POPE

NORMAN JAMES
 WILLIAM H. MATTHAI
 FREDERICK W. WOOD
 CHARLES H. KOPPELMAN
 ROBERT D. HOPKINS
 ARTHUR G. WELLINGTON

OFFICERS

WILLIAM H. CONKLING, PRESIDENT
 CHARLES C. HOMER, VICE-PRESIDENT

FREDERICK A. HOFFMAN, TREASURER
 CHARLES H. ASHBURNER, ASST. TREASURER

The Continental Trust Co.

BALTIMORE, MD.

Capital Resources, \$3,750,000

Accounts of Banks and Trust Companies
 received on liberal terms

Special Attention given to Collections

Transacts General Trust Company Business

Acting in all Fiduciary Capacities for Corporations
 and Individuals

CORRESPONDENCE INVITED

S. DAVIES WARFIELD, President

The National Bank of Commerce of Norfolk, Va.

NATHANIEL BEAMAN, President H. M. KERR, Cashier
 TAZEWELE TAYLOR, Vice-President M. C. FEREBEE, Asst. Cashier
 R. S. COHOON, Asst. Cashier

1912 over \$8,000,000.00
 RESOURCES
 1912 over \$8,000,000.00



What systematic effort did for the ancient Egyptians in
 building the Pyramids it has done for us—
 and will do for you

The National Bank of Commerce
 OF NORFOLK, VA.

offers its forty years of successful banking experience and
 resources to banks, corporations, individuals and firms
 needing superior banking facilities

Birmingham Trust & Savings Company

BIRMINGHAM, ALA.

Capital and Surplus - - \$1,000,000.00

THIS BANK was organized in 1887, with a paid in capital stock of \$500,000.00, has since that time accumulated a surplus fund of \$500,000.00, and has never failed to pay its semi-annual dividends.

¶ Its conduct has always been marked by the adherence to sound banking principles, and its deserved reputation for conservatism and strength has won for it the confidence of the public to an unusual degree.

¶ Prompt and efficient attention given to all matters entrusted to its care. Correspondence invited.

A. W. SMITH, Prest.

TOM O. SMITH, V.-P.

W. H. MANLY, Cashier

BENSON CAIN, Asst. Cashier

C. D. COTTEN, Asst. Cashier

E. W. FINCH, Asst. Cashier

First National Bank

RICHMOND, VA.

Capital, . . \$1,000,000.00
 Surplus, . . \$1,000,000.00
 Resources, . \$11,500,000.00



A Strong Commercial Bank aiding the production and distribution of commodities, and devoting itself to the upbuilding of industrial prosperity throughout the South.

OFFICERS

JOHN B. PURCELL, President
 JOHN M. MILLER, Jr., Vice-Pres. and Cashier.
 CHAS. R. BURNETT, Asst. Cashier.
 W. P. SHELTON, Asst. Cashier.
 FREDERICK E. NÖLTING, Vice Pres.
 J. C. JOPLIN, Asst. Cashier.
 ALEX. F. RYLAND, Asst. Cashier.

BOARD OF DIRECTORS

H. L. CABELL, of Branch, Cabell & Co., Bankers and Brokers.
 T. M. CARRINGTON, of Carrington & Co., Tobacconists.
 S. DABNEY CRENSHAW, Secretary Virginia-Carolina Chemical Co.
 A. H. CHRISTIAN, Jr., President Richmond Paper Mfg. Co., President Southern Railway-Supply Co.
 CHARLES DAVENPORT, Capitalist, of Chas. Davenport & Co., Wholesale Grocers.
 G. A. DAVENPORT, Capitalist.
 JNO. C. EASLEY, of R. B. Chaffin & Co., Real Estate.
 O. H. FUNSTEN, of Elam & Funsten, Real Estate.
 JOHN M. MILLER, Jr., Vice-President and Cashier.
 FREDERICK E. NÖLTING, Vice-President and Belgian Consul.
 JOHN B. PURCELL, President, formerly of Purcell, Ladd & Co., Wholesale Drugs.
 T. M. RUTHERFOORD, Capitalist.
 E. A. SAUNDERS, Jr., President E. A. Saunders' Sons Co., Wholesale Grocers.
 F. SITTERDING, Vice-President Virginia Railway & Power Co.
 I. STERN, of Stern & Co., Wholesale Shoes.
 A. D. WILLIAMS, Capitalist.
 HENRY W. WOOD, of T. W. Wood & Sons, Seed Merchants.
 COLEMAN WORTHAM, of Davenport & Co., Bankers, Brokers and Insurance.

Capital, \$1,000,000

Surplus and Profits, \$735,000

The National Exchange Bank

Hopkins Place, German and Liberty Sts.

BALTIMORE, MD.

Extends to you the accommodations of a Strong and Well-equipped Bank.

Foreign Exchange, Letters of Credit, Safe Deposit Boxes.

OFFICERS

WALDO NEWCOMER, President
 SUMMERFIELD BALDWIN, Vice-President
 R. VINTON LANSDALE, Cashier
 CLINTON G. MORGAN, Asst. Cashier

DIRECTORS

SUMMERFIELD BALDWIN Woodward, Baldwin & Co.	WALDO NEWCOMER President
PHILIP HAMBURGER Hamburger Bros. & Co.	GEO. CATOR Pres. American Bonding Co.
FREDERICK P. STIEFF Chas. M. Stieff, Piano Manufacturers	WM. A. DIXON Dixon, Bartlett Co.
WM. H. MATTHAI National Enameling & Stamping Co.	ROBT. M. ROTHER Pres. Hopkins Place Savings Bank
CHAS. W. DORSEY President Md. S. S. Assn.	BENJ. W. CORKRAN, JR. Street & Corkran Co.
ELI OPPENHEIM Oppenheim, Oberndorf & Co.	W. W. CATOR Armstrong, Cator & Co.
SAMUEL C. ROWLAND Vice-Pres. Baltimore Trust Co.	GEO. N. NUMSEN Wm. Numsen & Sons

THE First National Bank

OF KEY WEST

AT KEY WEST, FLA.

Capital, - - - - - \$100,000
Surplus and Undivided Profits, - - 50,000

DESIGNATED DEPOSITORY
AND DISBURSING AGENT
FOR U. S. GOVERNMENT

*The Oldest Bank in Key West, with Resources
of More than One Million Dollars*

Investing Money in the South

Millions of dollars in the choicest Southern Municipal tax-protected, steam and electric railroad and public service corporation bonds have been handled by this Firm in the past few years.

We are always interested in buying any good bonds of existing operating companies, or solid, substantial communities, where the obligations will meet the requirements imposed by a conservative Investment Banking Firm.

To the shrewd investor we offer a successful experience of many years' standing as a recommendation for an introduction. We have just issued our new and very interesting book, "The Trend of Investment," which should be in the hands of every investor, banker or business man who has the best interests of the South (or any portion of our country, for that matter) earnestly and seriously at heart.

A copy of this valuable work—the consummation of one Banking firm's untiring efforts for many years—will be sent on application to any interested investor or business man.

We sell bonds by mail all over the civilized world.

D. Arthur Bowman & Company

640 Third National Bank Building, St. Louis, Mo.

Peoples Bank of Anderson

ANDERSON, S. C.

PAID-UP CAPITAL \$200,000.00

We offer the complete service of a safe, solid and
conservative bank

Special and personal attention given to collections

LEE G. HOLLEMAN, President
JOS. J. FRETWELL, Vice-President
JOHN N. BLECKLEY, Vice-President and Cashier
D. O. BROWNE, Assistant Cashier

Virginia Trust Company

RICHMOND, VIRGINIA

Capital - - One Million

The

Oldest and Strongest
Trust Company in
the Old Dominion

Officers

HERBERT W. JACKSON, President
JAS. N. BOYD, Vice-Pres. JOHN M. MILLER, Jr., Vice-Pres.
L. D. AYLETT, Secretary JOHN H. SOUTHALL, Treasurer

First National Bank

SPARTANBURG, S. C.

Capital, - - \$500,000.00
Surplus, - - \$80,000.00

LOCATED on the Sunshine Route, in the Gateway of the Great Piedmont Section, this bank has had forty years of history and yet it is today forty years young in aggressiveness and strength. It has increased its Capital from \$100,000.00 to \$500,000.00, and has always been an upbuilder and a potent factor in the development of the country, its first thought being progress and a clean and faithful service to those who have given it their confidence. Its earmarks appear on every institution and every enterprise in this locality. The facilities of this bank for handling all classes of business, both local and foreign, are unsurpassed. Send us your business.

OFFICERS

W. E. BURNETT President	S. B. JONES Ass't Cashier
J. B. CLEVELAND Vice-President	FRANK C. ROGERS Ass't Cashier
A. M. CHREITZBERG Vice-President and Cashier	H. B. CARLISLE Attorney

The Huntington National Bank

HUNTINGTON, W. VA.

Capital,	\$100,000.00
Surplus and Undivided Profits,	\$170,000.00
Deposits,	\$1,000,000.00

Depository of the United States, the State of West Virginia, and the City of Huntington

OFFICERS

F. B. ENSLOW President	J. W. ENSIGN Vice-President	J. K. ONEY Vice-President	C. M. COHEN Cashier	O. K. HAYSLIP Asst. Cashier
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Huntington being the natural gateway to and from the great coal fields under development in Southwestern West Virginia and Eastern Kentucky, warrants the officers of this bank to offer its services to corporations, firms and individuals doing business in these sections. Courteous consideration as well as the best service is assured. Correspondence invited.

Your West Virginia Banking Business

will have prompt and efficient
attention if entrusted with the

Union Savings Bank and Trust Company

HUNTINGTON, WEST VA.

Waynesboro, Virginia

located on main line C. & O. R. R., in the heart of the famous apple section of Virginia, offers splendid opportunities to investors and home-seekers. Correspondence invited and information gladly furnished.

First National Bank, Waynesboro, Va.

ORGANIZED 1884

The First National Bank of Huntington

HUNTINGTON, WEST VIRGINIA

CAPITAL STOCK	\$500,000.00
SURPLUS	\$300,000.00

UNITED STATES DEPOSITORY

OFFICERS

J. L. CALDWELL, President	D. I. SMITH, Vice-President
L. V. GUTHRIE, Vice-President	
ROBT. L. ARCHER, Cashier	G. D. MILLER, Asst. Cashier

MEMBER

N. O. STOCK EXCHANGE
N. O. COTTON EXCHANGE
N. O. BOARD OF TRADE

STOCKS, BONDS AND
INVESTMENT SECURITIES
MORTGAGE LOANS

WM. J. CASTELL

626 GRAVIER ST.

NEW ORLEANS, LA.

Fiscal Agent: American Land & Securities Co. of Louisiana.

Louisiana is the choice field for investments yielding good returns.

Bankers and Investors

Would You Buy THREE-NAME COMMERCIAL PAPER Secured by Collateral With a 20% Margin?

Do you believe it possible to lose \$541,284.29 on \$972,242.83 active commercial accounts owing by thousands of firms from Maine to California with all accounts guaranteed by Manufacturers and Wholesalers?

We make no loans, but buy open accounts outright, retaining a 20% reserve, payable only when the accounts are collected, although the usual risk of loss is less than 1% without any guarantee. We would have to lose the 20% reserve of \$194,450.24 and our cash capital and surplus of \$346,834.05 on \$972,242.83 accounts guaranteed by sellers thereof before our collateral trust note holders could lose a dollar.

Our COLLATERAL TRUST NOTES, issued in any maturity under one year in amounts of \$500 and multiples thereof, are secured ratably and without preference by such accounts deposited with our Trustee. Each note is REGISTERED by and bears the Certificate of our Trustee under agreement that there shall always be on deposit with the Trustee not less than 20% MINIMUM MARGIN in guaranteed accounts receivable not over thirty days past due, or cash, in excess of the total of said notes at any time outstanding, otherwise, the Trustee is empowered to declare all of said notes due and payable and to proceed with foreclosure.

If the SINGLE NAME notes of Manufacturers and Wholesalers and their endorsed bills receivable are worth 100%, shouldn't the open accounts receivable of such firms—instead of notes—deposited with a Trustee and guaranteed for 100% by such firms and also by our Company be worth only 80% borrowed by us thereon?

We borrow ONLY ON COLLATERAL TIME LOANS in well distributed maturities, and always have large reserve credit with our depositories, have nothing but QUICK ASSETS—cash and accounts receivable guaranteed as above—and, less cash, do not owe 50% of our quick assets.

Where can you find a more attractive short term investment for surplus funds at a good rate of interest?

BALTIMORE

THE BALTIMORE TRUST COMPANY
THE NATIONAL BANK OF COMMERCE
THE FIRST NATIONAL BANK
THE CITIZENS NATIONAL BANK

DEPOSITORIES

PHILADELPHIA
THE GIRARD NATIONAL BANK
THE PHILADELPHIA NATIONAL BANK
THE BANK OF NORTH AMERICA

NEW YORK

THE AMERICAN EXCHANGE NATIONAL BANK
TRUSTEE
THE BALTIMORE TRUST COMPANY

Write for further information

MANUFACTURERS' FINANCE COMPANY

709-710 KEYSER BUILDING, BALTIMORE, MD.

Manufacturers and Wholesalers

Rated \$10,000 to \$20,000 and higher

DO YOU WANT YOUR CUSTOMERS TO DIS- COUNT YOUR INVOICES?

If so, why not give us the discounts you offer to your customers for cash? You can place your credit sales upon an 80% cash basis AT THE EXPENSE OF YOUR CUSTOMERS through their not taking your discounts.

We will pay you 80% CASH AT TIME OF SHIPMENT and carry their open accounts until paid, paying you the 20% reserve, as each account is collected by you. You sell your invoices, therefore, borrow no money and have no obligation to meet as your customers pay us off.

Of \$972,242.83 accounts due us December 30th, 1911, \$837,543.51 were sold and are guaranteed for 100% by manufacturers and wholesalers rated over \$20,000 with first or second credit in January, 1912, Bradstreet or Dun. In fact, \$479,538.44 were sold and are guaranteed by such firms rated over \$50,000.

You mail your INVOICES DIRECT TO YOUR CUSTOMERS WITHOUT ANY NOTICE THEREON of the sale of their accounts to us. You act as our AGENT to collect all accounts sold us, endorsing your customer's original remittances to us, and by us to our Banks as "V. G. Dunnington, Treasurer," thereby our name does not appear thereon. We can send you Bank Drafts instead of our checks, and all publicity is avoided.

Our total discounts are only 1% on the face of invoices paid within 15 days from date of our purchase, 2% within 30 days, and then 1% a month until paid. We charge NO INTEREST OR EXCHANGE on checks and carry accounts until they are SIXTY OR NINETY DAYS PAST DUE.

We are now using about ONE MILLION DOLLARS CASH in the purchase of some FIVE MILLION DOLLARS of open accounts a year from large and well-rated firms, whose names we keep in the strictest confidence.

Why not give our plan a trial NOW with \$5000 to \$25,000 of your present open accounts?

Figures tell more than words of the growth of the South, of our business there and of our justified confidence in the future.

Public service management by the Stone & Webster Management Association, undertaken in Tampa in 1900, now includes operation in Columbus, Savannah, Key West, Pensacola, Jacksonville, Baton Rouge, Dallas, Houston, Galveston, Fort Worth, El Paso and Beaumont

And represents nearly seven million dollars of new capital invested during the year ending November 30th, 1911, in thirteen independent properties

And a demand from the South for the public service of the companies operated which in 1911 was measured by eight million dollars of gross earnings.

STONE & WEBSTER

147 Milk Street

NEW YORK
5 Nassau Street

BOSTON

CHICAGO
First National Bank Building

The Palmetto National Bank

OF

COLUMBIA, S. C.

Capital and Surplus, - - - \$325,000.00



The New Fifteen Story Building now in course of construction which is to be the Home of the PALMETTO NATIONAL BANK.

This Bank is thoroughly organized and equipped for the prompt handling of all items on South Carolina. It is centrally situated and has direct daily connection with every banking point in the State.

OFFICERS

Wilie Jones, President
Jno. J. Seibels, Vice-President
Thos. Taylor, Jr., 2nd Vice-Prest.
J. P. Matthews, Cashier
Wm. M. Gibbs, Jr., Asst. Cashier

6% GOLD BONDS 6%

FIRST MORTGAGE on High Class Business, Farming and Residential Properties, Conservatively Appraised at Twice the Total Bond Issue, with Earning Capacity of Over Twice Interest Requirements.

BONDS bearing Highest Rate Obtainable Consistent with Safety as to Principal and Interest. Denomination of \$500 and \$1,000.

BONDS and Coupon Form, interest payable semi-annually, Investor relieved of details, as the Lynchburg Trust and Savings Bank, who are Trustees in the Mortgages, collect interest and principal when due and make remittance when desired.

VALUE, standing and character of the investments offered by us, you can independently investigate by yourself, without cost, and through unquestionable, unbiased channels, as we can refer you to the following Lynchburg National Banks:

PEOPLES NATIONAL BANK
LYNCHBURG NATIONAL BANK
FIRST NATIONAL BANK
AMERICAN NATIONAL BANK
NATIONAL EXCHANGE BANK

High Class Income
Investments in Real Estate,
Bond and Loans

WALKER & MOSBY
Established 1890
LYNCHBURG, VIRGINIA

B. F. Bond Paper Company

NIANTIC MILLS BOPACO BOND
ATLANTIC LEDGER

Papers of Sterling Quality, yet low in price and perfectly adapted for all ordinary commercial work.

ASK YOUR PRINTER FOR SAMPLES
AND QUOTATIONS

We sell Paper, Card Board, Envelopes, Wrappings and Twines of every class and grade.

B. F. BOND PAPER COMPANY
BALTIMORE, MD. WASHINGTON, D. C.

To Build Up the South

is the laudable ambition of every man in the South.

How to Build Up the South

should be the special study of every man in the South.

Among the great drains upon the cash resources of the South probably none has been greater than the Insurance drain. Insurance is a recognized necessity, and as such must be had by Southern people. Until recently the money spent by Southern people has gone to increase the financial strength and enlarge the influence of institutions of other States. Within the past few years, however, the South began to study the subject of insurance—LIFE INSURANCE in particular—with the result that several old-line, legal reserve, level premium life insurance companies have been organized for the purpose of stopping this drain upon southern resources, which had run up into HUNDREDS OF MILLIONS OF DOLLARS. These southern companies furnish insurance at rates as reasonable as those of the older companies, and value their policies by the same rigid standards. Their funds are ALL invested in the South, and aside from this fact their lower expense and higher interest should give BETTER NET RESULTS to policyholders than can be given by the older and larger companies.

THE NORTH STATE LIFE INSURANCE CO.
KINSTON, N. C.

is one of these vigorous young companies that is helping to build up the South. It operates only in the Carolinas.

N. J. ROUSE, President
A. E. ROUNTREE, Secretary
S. R. DUNN, Cashier

J. A. HERNDON, General Manager
DR. J. M. PARROTT, Medical Director
MILES M. DAWSON, Consulting Actuary

Interurban Railways and Electric Power Plants

ORGANIZED
FINANCED
CONSTRUCTED
OPERATED

We invite inquiries from individuals, corporations, communities or commercial clubs desiring to secure prompt development of natural resources.

Our business is confined solely to the development of electric railways and power plants.

American Traction & Power Company

(INCORPORATED)

HUME-MANSUR BUILDING

INDIANAPOLIS, INDIANA

RATE OF INTEREST REALIZED

Showing Rate of Interest Realized by the following Companies

(From the Compendium of Life Insurance Reports, 1911)

SOUTHEASTERN.....	7.36 per cent.
Union Central.....	6.47
Life Insurance Co. of Virginia.....	5.28
Fidelity Mutual.....	5.13
Penn Mutual.....	5.02
Aetna Life.....	4.97
Mutual Benefit.....	4.92
Metropolitan Life.....	4.91
Mutual of N. Y.....	4.75
Prudential.....	4.64
Equitable.....	4.55
New York Life.....	4.50

The Reason

Money loaned on South Carolina real estate yields the best returns. Out of 156 companies in the United States, only three realized a better rate of interest than we in 1910. The reason we head this list is because the demand for money in South Carolina is far greater than the supply. When our people stop sending millions out of the State every year, we cannot boast of this good rate. Notice how cheap money is in the North and East—made cheap by the steady supply flowing into these centers from every hamlet in the South. Their rates of interest are low, but who gets the benefit of it?

SOUTHEASTERN LIFE INS. CO.

GREENVILLE, S. C.

ORGANIZED 1871

LIFE INSURANCE COMPANY OF VIRGINIA

HOME OFFICE, RICHMOND, VA.

J. G. WALKER, President

T. WM. PEMBERTON, 1st Vice-Pres.

W. L. T. ROGERSON, 2d Vice-Pres.

E. D. HARRIS, Secretary

Oldest, Largest, Strongest Southern Life Insurance Company

It issues in its Ordinary Department the most liberal forms of policies from \$1,000 to \$25,000.00

on the

NON-PARTICIPATING
PLAN

It issues Industrial Policies from \$8.00 to \$1,000.00 with premiums payable weekly on persons from two to seventy years of age.



NEW HOME OFFICE BUILDING

Now being erected, will be ready for occupancy in the Spring of 1912.
Location: Capitol Street, fronting Capitol Square.

Its policies are clear and definite in their provisions, and their values are absolutely guaranteed.

Its history has been characterized by its liberal forms of policies; its prompt settlement of Death Losses without litigation; its equitable dealing with its policyholders; its strength of organization, and everything which contributes to the security and economy of Life Insurance.

Assets.....	December 31, 1911	\$ 7,378,967.24
Liabilities.....	" " "	5,975,285.33
Capital and Surplus.....	" " "	1,403,681.91
Insurance in Force.....	" " "	78,499,874.00
Total Payments to Policyholders Since Organization.....		11,859,251.74

ALL CLAIMS PAID IMMEDIATELY UPON RECEIPT OF SATISFACTORY PROOFS OF DEATH

F. E. HALL, Superintendent Ordinary Agencies, Richmond, Va.

WHEELING

THE LEADING CITY OF A GREAT STATE

With its broadly diversified manufacturing plants
Its substantial financial and business institutions
Its inviting opportunities industrially and commercially

WELCOMES NEW MEN AND NEW MONEY

and offers the following desirable advantages

Cheap Fuel, both Coal and Natural Gas
Excellent Transportation Facilities with same Freight Rates as Pittsburg
Close Proximity to Raw Materials and Big Markets
Good Labor Supply, and Low Taxes.

MANY SPLENDID SITES FOR NEW PLANTS.

**Big Guarantee
Fund to Aid
New Industries**

For further facts write

**Board of Trade
Wheeling,
W.Va.**

WEST VIRGINIA

"The Black Diamond State"

1,500,000 Acres Virgin Forest
5,000,000 Acres Grazing Lands
5,000,000 Acres Finest Fruit Lands
10,000,000 Acres Agricultural Lands
Thousands of Oil Wells, producing
millions of barrel of Oils

6,000,000 Acres of Coal
300,000,000 Tons of Iron Ore
Limitless Supply of Natural Gas
25,000,000,000 Feet of Standing Timber
Inexhaustible quantities of Limestone
Clays, Shales and Glass Sands

For detailed information address

**WEST VIRGINIA
BOARD OF TRADE
WHEELING
W. VA.**

**Finest
Fruit Lands
In America**

**Climate
and Soil
Unsurpassed**

The Land Overlooked

**The South Branch Valley in Hampshire, Hardy and Grant Counties,
West Virginia**

Climate unsurpassed.

Thousands of acres of undeveloped fruit lands, where the finest peaches and apples are already grown and where a fruit failure rarely occurs.

Pure water, ideal section to live, and splendid opportunities. A section on the eve of a great development.

Three County Towns:—

Romney, the County Seat of Hampshire;

Moorefield, the County Seat of Hardy;

And Petersburg, the County Seat of Grant.

A section where you can really live 24 hours a day.

THE SOUTH BRANCH BOARD OF TRADE

JNO. J. CORNWELL, President.

ROMNEY, W. VA.

HUNTINGTON, W. VA.

The Gateway to the Nation's Treasure House

FROM the top of our tall buildings you can see the rich farming country of Southern Ohio, the hills of Eastern Kentucky covered with fine timber and bulging out with coal, and the hills of our own State teeming with oil, gas, coal, building stone, timber—all at our doors.

35,000 people to welcome you.

Knockers all dead.

Boosters carry every precinct.

Perfect transportation facilities

Railroad rates tempered by river competition

THE BEST TOWN IN THE BEST STATE

FOR THE MANUFACTURER

FOR THE INVESTOR

FOR THE JOBBER

FOR THE HOME BUILDER

Ask for our new panoramic map showing everything about the city. We will be at the depot to meet you

Cable
Address:

"Get There"

The Chamber of Commerce
Huntington
W. Va.

Mr. Manufacturer,
Turn Your Eyes to West Virginia!

Why pay high prices for West Virginia's famous fuels, Bituminous Coal and Natural Gas, hauled and piped hundreds of miles, when by planting your factory in this State you can get both at lowest rates,—Coal as low as 90c. a ton and Gas as cheap as 4c. per thousand cubic feet? Besides these great fuel advantages, West Virginia lies in the midst of the most populous section of the country, close to the greatest markets and near the raw materials. It has cheap sites for factories, intelligent and contented labor and low taxes; with progressive communities which welcome new men and new money. Within the last five years, according to official census figures, the number of manufacturing plants in West Virginia increased 23%, and the capital invested 74%. This proves that many manufacturers are making good use of West Virginia's cheap fuels and other superior advantages. WHY NOT YOU? West Virginia has a combination of elements for manufacturing that spells success. You can't beat it in this broad land! For further information, write

"The
Fuel City of
the Fuel State"

West Virginia Board of Trade
Wheeling, W. Va.

You will
prosper in

Clarksburg, W. Va.

WITHIN a radius of 25 miles of Clarksburg 1,000,000,000 cubic feet of natural gas is produced daily, and manufacturers are sold

**Natural Gas Four Cents
Per 1000 Cubic Feet**

CLARKSBURG is also surrounded by enormous high-grade coal fields, the product of which is sold at very low cost; large areas of virgin hardwood timber; extensive deposits of clays and other raw materials, all of which combine to offer inviting opportunities to manufacturers, investors and capitalists.

Correspondence Solicited

Clarksburg Board of Trade
Clarksburg, W. Va.

Morgantown, W. Va.

Gateway to West Virginia's Wealth

CHEAP COAL AND GAS

Limestone, Glass Sand, Clays, Building Stone

Good Location for Iron Industries

Tin Plate Mill, Cement Plant, Clay Plant

NO LABOR TROUBLES

Three Big Railway Systems

Low Water Rate to Gulf

MARKET

Ten Million People in Six Large Cities

Sixteen Hours from Morgantown

*Guaranty Fund of \$350,000 for New Enterprises
Free Factory Sites*

A CITY OF INDUSTRY AND CULTURE

University, Good Public Schools, Good Homes, Good People

WELCOME TO MORGANTOWN

Morgantown Board of Trade
Morgantown, W. Va.

The Gateway to the Black Diamond State's
GREAT POCAHONTAS COAL FIELD

West Virginia produced over 60,000,000 tons of coal last year, and 19,443,987 tons of it were directed in movement by business men of

BLUEFIELD, W. VA.

The city of 142 per cent. increase in population, on the site of which a lonely farmhouse stood 25 years ago, and now 16,000 people dwell in modern homes and transact \$12,000,000 of business in substantial blocks.

Wholesale Distributing Point From Which 250,000 People in Southern West Virginia, Eastern Kentucky and Southwest Virginia Draw their Supplies.

Bluefield is 2557 feet above sea level, midway between Columbus and Cincinnati and the Atlantic Seaboard; has a delightful climate, no epidemics, remarkably low death rate, never failing supply of pure water from mountain springs, no mosquitoes, no paupers. Fourteen Churches; School Facilities the best in the South, representing over \$300,000 actual investment.

Hydro-Electric Current of 75,000 H. P. being developed for manufacturing purposes.

Gas Plant with ample facilities for town of 50,000 population (three hundred thousand cubic feet daily).

Attractive for home seekers.

Advantageous for business and industrial investment.

This is only a hint. Get it all from

CHAMBER OF COMMERCE, T. B. BREEN, Secretary, BLUEFIELD, W. VA.

SAVANNAH, GEORGIA

Fertilizer Manufacturing Center of the South
 and Sixth Largest City in Exports in the United States

The Land of Opportunity. I am now offering factory sites which have access to all four railroads entering Savannah, and situated on the Savannah River, the only available water front near the city.

I am also offering a few choice sub-division sites near the city; income bearing city property; a beautiful rice plantation now used as a truck farm; and some farming propositions with railroad and water transportations. Write me for information.

FRANK WHITNEY, Room 207 Germania Bank Bldg., SAVANNAH, GA.

7% Georgia First Mortgage Loans Yield You 7%

25 Years' Experience Without Loss of a Dollar. Farms and City Property For Sale. Completely Furnished 26-Room Hotel For Sale, \$18,000.00.

SESSIONS LOAN & TRUST CO., - MARIETTA, GA.

OIL AND GAS LANDS IN OKLAHOMA FOR LEASE

Over 2500 acres of OIL and GAS lands in OKLAHOMA for LEASE on liberal terms. These lands lie in several COUNTIES and in localities of those counties that are recognized as being among some of the greatest OIL and GAS pool districts of the State, easily accessible to city and railroad facilities.

When the present OIL and GAS activities of the districts embracing these lands are fully developed, indications point to openings of vast and rich petroleum fields. Address
SPENCER ADAMS, 814 Mills Building, Navy Department, WASHINGTON, D. C.

Murphy's Hotel and Annex, Richmond, Va.

The largest, most modern and best located hotel in the city
 being situated on Broad Street, just opposite the theaters
The Grace Street Annex Absolutely Fireproof

Murphy's Hotel, Inc.

is conducted
 entirely on the

European Plan

with
 3 elegant cafes
 in connection

Rates \$1 and Upwards

JOHN MURPHY, Pres.

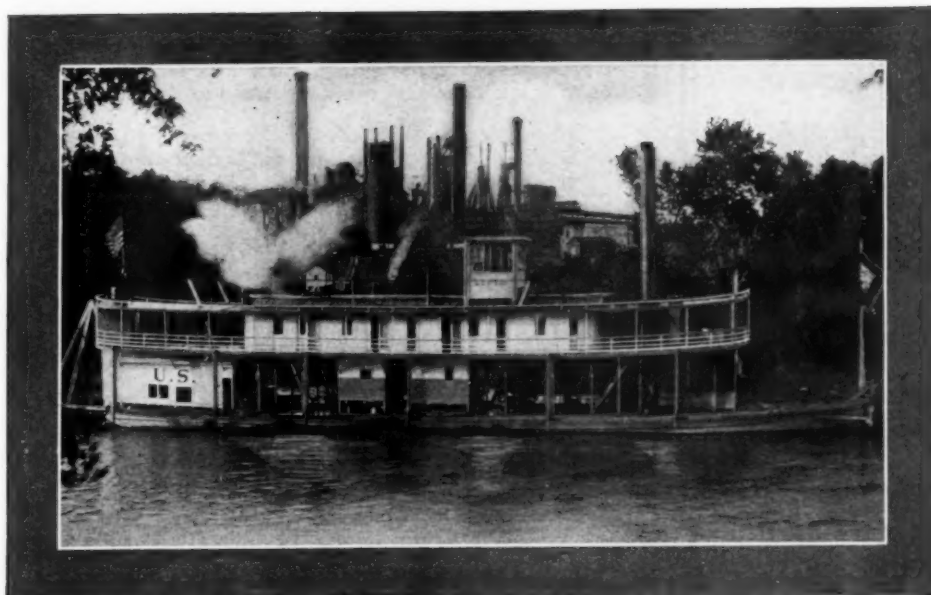


JAS. T. DISNEY, Mgr.

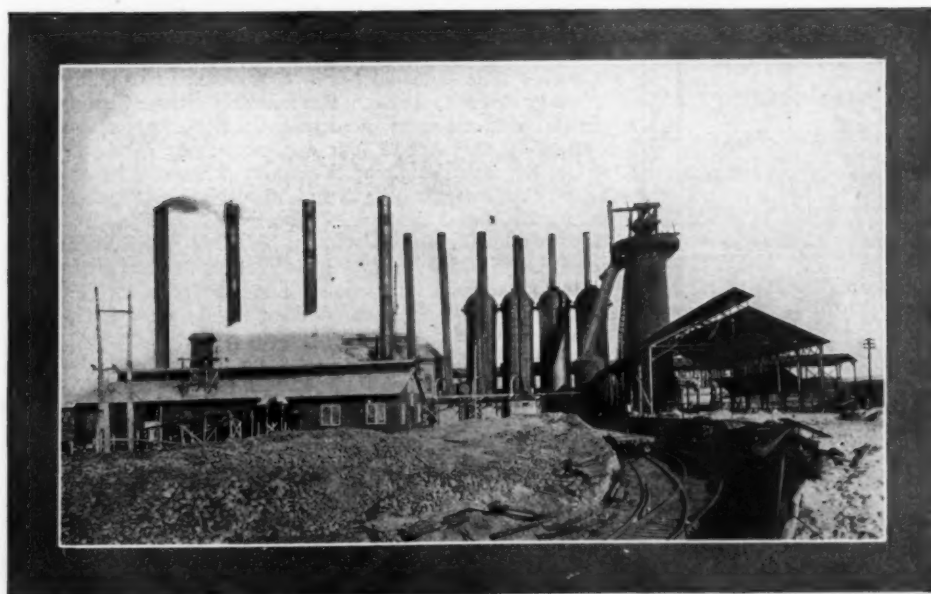
GADSDEN, ALA.



BROAD STREET.



ALABAMA CONSOLIDATED COAL AND IRON CO'S PLANT. FROM THE RIVER.



IRON PRODUCERS OF THE SOUTHERN IRON AND STEEL CO.

The Queen City of the Coosa

Offers splendid opportunities to the
CAPITALIST,
for profitable investment;

MANUFACTURER,
for the location of his plant;

MINE OPERATOR,
looking for rich mines;

MERCHANT,
for the establishment of almost any
kind of business;

Business or Professional man in
general.

It has ample transportation facilities,
giving connection with all parts of
the Country—5 railroads (others pro-
jected) and will soon have navigable
river to the Gulf.

It has abundant fuel, right at hand.

It has many advantageous industrial
sites waiting for occupancy, and has
good labor.

It has limitless natural resources for
almost any kind of industry, being in
the very heart of a section containing
unbounded quantities of coal, iron
ore, limestone, building stone, marble,
molding sand, clays, and timber—both
hard and soft wood.

Some of the plants located here : re:

Southern Iron & Steel Co.

Alabama Consolidated Coal & Iron
Co

Dwight Cotton Mills.

Gadsden Car Works.

Southern Shovel Mfg. Co.

Coosa Pipe & Foundry Co.

Kyle Lumber Co.

Etowah Fertilizer Co.

Gadsden Marble Works.

Southern Mfg. Co. (Sash, Doors,
etc.)

Legard Lime & Stone Co.

Alabama City, Gadsden & Attala
Railway.

There are a great many others en-
gaged in various lines of manufacture.

Gadsden is the county seat of
Etowah Co. It has a delightful,
equable climate, modern municipal
improvements, good schools, and
churches of all denominations.

Sincere attention and full informa-
tion will be given inquiries.

Business Men's Club

W. R. PHILLIPS, Sec.,

GADSDEN, ALA.

RUTHERFORDTON, N. C.

with resources, sites and facilities

Wants More Industries and Residents

Located in Western N. C. on Southern and S. A. L. Railroads, in foothills of the Blue Ridge, right at famous Thermal Belt, protected from severe cold in Winter and sultry heat in Summer. Entire county is free from swamp or marsh miasma. Not a boom town, but real estate is steadily increasing in value.

NOW HAS

1500 population, doubled in last five years. \$50,000 surgical hospital. \$50,000 court house. \$10,000 graded school building. Churches, hotels, banks, business houses, etc. One cotton mill, and two gins. One roller flour mill, veneering factory, foundry and two planing mills. Local and long distance telephone. Municipal-owned electric light, power and water plant. Bank clearings for 1911—\$1,500,000.

Plenty good sites for business, manufacturing and residence. Ample resources to support industries of various kinds. Many profitable investment opportunities. The town can furnish first-rate hydro-electric power cheap.

We want to interest capitalists, manufacturers and home-seekers, and information will be cheerfully given by

Dr. A. C. Hook, Mayor, Rutherfordton, N. C.

"The Borderland of the Sky"

MARION, N. C.

The most promising section in the foot-hills of the Blue Ridge; two trunk lines of Railroad; one branch line, sixteen daily passenger trains; eight hardwood manufacturing plants; one cotton mill; two banks; two hotels, with accommodations the best; fine undeveloped back country of farming, stock-raising and fruit-growing lands; undeveloped water-power can be purchased reasonably; manufacturing sites along the railroads for sale; cost of living low; labor cheap; the strongest inducement offered for investment in manufacturing plants and undeveloped lands; local co-operation guaranteed; climate ideal, both winter and summer; great resort country; elevation 1450; rain fall uniform. Full information can be had by addressing,

B. B. PRICE

Care Chamber of Commerce

MARION, N. C.

Laurinburg

A Prosperous, Live,
Substantial Town in

Scotland County, North Carolina

The county-seat of Scotland County, a section of North Carolina remarkably rich in agricultural resources, achievements and possibilities. A town which has never had a spasmodic "boom," but enjoys a steady, persistent and healthy growth.

Population, Census 1900, 1334

Population, Census 1910, 2322

Population, East Laurinburg, 1910, 577

Total Population, 1910, 2899

THE COUNTY

Scotland County is a prosperous section of the South. Its lands are highly productive and its citizens well-to-do and progressive, living in handsome and comfortable homes, many of which are equipped with lighting plants and water-works. There are more automobiles in the county, owned largely by the farmers, to the square mile than in any other county in the State.

The chief agricultural crops are Cotton, Cantaloupes, Melons, Asparagus, and other truck. These are produced for the market. Corn and other grain are grown also. Scotland County produces cantaloupes of superior quality, which have for years been selling on their merit and have won a reputation on the Northern markets.

During the year 1910 Scotland County received from her agricultural products that went upon the market an income of \$165 for every man, woman and child in the county. A record that she challenges any county of the South to meet.

During the year 1911 Scotland County produced TWO BALES OF COTTON for every man, woman and child in the entire county. Another record that should interest the farmer who is looking for good lands.

According to the December, 1911, reports of the banks of the county, there was on deposit in the several banks the sum of \$76 for every man, woman and child in the county.

The sum of \$130,000.00 has been voted by the citizens of the county for the building and maintenance of good roads, and many miles of first-class sand-clay highways have already been constructed.

THE TOWN

The TOWN OF LAURINBURG has several commercial enterprises, but has room for many more. With the great, rich surrounding country, the prosperity of the town is assured.

Owens its electric light and water systems, water supplied by an over-flow well; splendid health conditions; granolithic pavement; a free graded school system that ranks high in the State; a hospital, the James Sanatorium, modern in its equipment and manner of operation; churches of four denominations—Methodist, Presbyterian, Baptist and Episcopalian; three prosperous banks—Scotland County Savings, State Bank and First National Bank; six cotton yarn mills, three in town—Waverly, Scotland and Dixon, and three nearby—Springfield Cotton Mill, Ida Yarn Mill and Richmond Cotton Mill; oil mills; fertilizer plants; real estate agencies; building and loan associations; first-class hotels; newspaper and printing establishment; competitive freight rates, having connection with two of the big railway systems of the South, the Seaboard Air Line and the Atlantic Coast Line through its connection, the Laurinburg & Southern Railroad.

The town has for the homeseeker and the seeker for safe investments bigger things than are mentioned above; it has MAGNIFICENT OPPORTUNITIES for these.

Correspondence is solicited. Write

E. H. GIBSON, Mayor

LUMBERTON

A

Growing Town in North Carolina

Is the County-seat of Robeson County, located on Lumber River, offers an example of rare growth and development.

Population, Census 1900, 864

Population, Census 1910:

Lumberton, 2230

East Lumberton, 881

West Lumberton, 231

North Lumberton (estimated), 275

Total Population, 3617 864

Gain in population in last 10 years . 2753 = 318%

Surrounded by densely populated community, making a population of about 6000 people in town and suburbs.

It is a town of splendid health record, has granolithic pavements, and street paving is to be started at once. Eight Flowing Artesian Wells situated in different sections of the town furnish an abundance of pure drinking water. Water-works and Electric Light Plants owned by the town. Complete system of sewerage.

Free graded schools for white and colored races. Main school building for white race cost \$40,000.00, fitted with steam heat, electric lights, water-works, etc.

Finest County Court House in the State, cost \$65,000.00; splendid churches, First Baptist Church just completed, cost \$40,000.00; Methodist Church nearly completed, cost \$30,000.00; Presbyterian Church with all modern conveniences; Tabernacle Church with large seating capacity. Several churches and private schools for colored race.

Splendid Hospital with modern appliances, and an excellent corps of Doctors and Nurses.

Three Railroads: Seaboard Air Line Railway, Virginia & Carolina Southern Railway, Raleigh & Charleston Railway.

Three Banks: Bank of Lumberton, \$100,000.00 capital; First National Bank, \$50,000.00 capital; Farmers and Merchants Bank, \$15,000.00 capital.

Building and Loan Association; Real Estate Agencies; Robeson Development Co.; A. K. & J. W. Co.; Robeson Loan & Realty Co.

Four Cotton Mills in suburbs representing an investment of \$1,040,000.00: Lumberton Cotton Mills, Dresden Cotton Mills, National Cotton Mills, Jennings Cotton Mills. The average net earnings of these mills for six years has been 25% per annum on capital stock.

One Cotton Seed Oil Mill, capital \$50,000.00.

One Lumber Mill, capital \$60,000.00.

Two Newspapers: the old reliable "Robesonian," issued twice a week; the "Robeson Advance," issued once a week.

Large mercantile establishments carrying stocks from \$1,000.00 to \$100,000.00 each.

Commercial and Industrial Club composed of leading merchants and professional men.

The citizens of Lumberton extend the glad and welcome hand to all good people who desire to locate here.

We invite investigation, and are willing to stand upon our merits. Address

A. E. WHITE, Mayor, or R. D. CALDWELL, Pres.
Commercial and Industrial Club

ASHEVILLE, N. C.

"The Land of The Sky"

Asheville's rapid growth has made it necessary for the N. C. Electrical Power Co. to construct its third hydro-electric power plant, making a total of 10,000 h. p., to supply the increasing demands for light and power.

Asheville is situated in midst of largest body of standing hardwood timber in the country. Advantageous locations for making spokes and handles, staves and furniture of all kinds, buggies, and especially farm wagons.

Has 31,000 population, including suburbs; 38 miles paved streets; 60 miles paved sidewalks; pure mountain water from slopes of Mt. Mitchell, 10,000 acre watershed owned by city; 16 graded school buildings; 30 churches; 26 miles electric street railway; 60 miles sewer mains; abundance of satisfied labor; five banks; million dollar annual industrial payroll.

For descriptive literature write BOARD OF TRADE

HENDERSON, N. C.

Offers the Best Railroad Opportunity in the Whole South. A 50-mile Road through a splendid section, connecting Four Big Systems, can be built for \$350,000. Henderson will give this Road a \$200,000 business the first year. It will connect the East with the West, and is Better than A GOLD MINE. Henderson has increased its Railroad Business 300% in 7 Years and will reach \$500,000 mark in 1912. If interested, write

CHAMBER OF COMMERCE

HENDERSON, N. C.

Heating and Ventilating Apparatus

We have heated and ventilated more buildings in the South than any other firm.

All our work is fully guaranteed.

THE PECK-HAMMOND COMPANY

CINCINNATI, OHIO.

ROCKINGHAM, N. C.

Has All the Elements of Industrial Upbuilding and Invites Industries

On main line S. A. L., 76 miles from Charlotte, 100 miles from Raleigh and 125 from Wilmington, with the A. C. L. very nearby. Six miles from Pee Dee River, where the red clay lands give way and the better grade of sand lands commence.

The Yadkin Power Dam, generating 30,000 H. P., to be distributed throughout this section, is only 9 miles away, and the transmission lines are now being built into Rockingham.

Fine industrial locations can be had on either railroad, and cheap power is offered by the Yadkin Power Co. Nine mills already located here run by water-power and by steam. Situated in the midst of fertile farming country, where cotton and corn grow to perfection, and where soil and climate will produce anything on earth.

Rockingham is 40 miles south of the great Southern winter resort, Pinehurst, and is equally healthy and pleasant. Has one of the best graded schools in the State, whose graduates are prepared to enter the State University or any Woman's College. The town owns its water-works, water being taken from the sand hills of Richmond county and brought by gravity to local pumping station, where it is filtered and distributed.

Rockingham and Richmond county offer to homeseekers and those wanting manufacturing sites 300 miles of the best sand clay road in the world. They are joined on the north with the Pinehurst roads, and on the south by system of South Carolina roads. The Capital-to-Capital Highway passes through the center of Rockingham.

Information about the many resources and advantages of Rockingham will be gladly given by

W. M. EVERETT, Mayor. ROCKINGHAM, N. C.

Roanoke Rapids Power Company

ROANOKE RAPIDS, N. C.

83 miles from Norfolk, Virginia
105 miles from Richmond, Virginia
12 hours by rail from New York, N. Y.

W. M. HABLSTON, Pres.
Richmond, Va.

HENRY LEWIS MORRIS, Vice-Pres.
New York, N. Y.

J. T. CHASE, Mgr.
Roanoke Rapids

10,000 Developed Horse Power

RATES FOR HYDRO-ELECTRIC POWER
in 300 H. P. units and upwards:

Day Use,	\$22 per Horse Power per Annum
Night Use,	15 " " " " " "
Day and Night Use,	35 " " " " " "

U. S. Census, referring to the power, speaks of it as of great capacity.

Senator Dawes, in a speech delivered at Hoosac Valley Fair, refers to it as "Superior in every respect to that which furnishes employment to 26,000 people at Holyoke, 40,000 at Lawrence, and 60,000 at Lowell."

Come to Georgetown South Carolina

And see the opportunities offered industrious farmers to engage in profitable farming in the

"Nation's Garden Spot"

The Georgetown Farm Land and Homeseekers' Company

Is offering fertile farm lands within a few miles of the thriving City of Georgetown, S. C., suitable for the raising of general farm and garden truck crops, fruits and nuts. Price of land, \$25.00 per acre. First payment, \$2.00 per acre cash, and \$1.00 per acre thereafter until farm is paid for—free of taxes, interest and cost of papers to purchaser until paid for. Each farm contains 25 acres, and is on a public road.

You can purchase more or less if you wish. If interested, come and see and investigate, or write President of Company for literature and further information.

Georgetown Farm Land and Homeseekers' Company

BANK OF GEORGETOWN BUILDING
GEORGETOWN, S. C.

WHILE ALL THE SOUTH IS BIDDING FOR INDUSTRIES, HAVE YOU INVESTIGATED

Wadesboro, North Carolina

Three systems of railroads—Seaboard, Atlantic Coast Line and Norfolk & Western—afford unsurpassed transportation facilities. Intelligent and skilled labor in abundance. Cheap electric power generated by Pee Dee River, 12 miles distant. City electric lighted, with water-works, sewerage and improved streets. Situate in the midst of a rich farming section, with soil adapted to the growth of finest variety of short staple cotton, grain, fruit and truck farming. Climate equable and delightful entire year.

We desire to discover the man or enterprise seeking a new location. If you have money, we will help you earn more. If you have but little, we want you—you need our help. If you have no money, but good character, you are none the less desired.

While you are thinking about it, just write us a word. We want to know you. It will do you good to know us.

Splendid opportunity for investment in electric car line from railway station to city, carrying freight and passengers. Investments small; results guaranteed to be large.

For information write

WIDE-A-WAKE CLUB

L. J. HUNTLEY, Secretary

T. L. CAUDLE, President

Prettiest Town in Dixie

Cheraw, South Carolina

SETTLED 1766

Midway between the Famous Winter Resorts of Pinehurst, North Carolina, and Camden, South Carolina.

Two Trunk Railway Lines—S. A. L., New York to Florida; Southbound Railway, Charleston, S. C., to Chicago.



In the Rich Agricultural Pee Dee Country



One Mile from Marlboro County, South Carolina, which holds the World's Corn Record for One Acre, 257 Bushels.

Not only a Good Place to Make Money, but a Pleasant Place to Live. Ten Miles of Streets, 100 feet wide, "laid off like a checkerboard," Shaded by Three Rows of Stately Oaks and Elms. Ask Your Tourist Friend about this Charming Old Town.

WRITE US - INVESTIGATE US - COME TO SEE US

CHERAW BOARD OF TRADE
CHERAW, SOUTH CAROLINA.

ROCK HILL (S. C.) "IS A GOOD TOWN"

SEEING IS BELIEVING

POPULATION

1890--2,743

1912--12,000

WE WANT LIVE CITIZENS

FOR INFORMATION WRITE

CHAMBER OF COMMERCE

The Robeson Development Company

(INCORPORATED)

of LUMBERTON, N. C.

A. W. McLean, President, and A. T. McLean, Treasurer and General Manager, is developing **Ten Thousand Acres** of fine farming lands along the line of the Virginia & Carolina Southern Railroad in Bladen County, North Carolina. This land is all of the very finest soil, naturally drained, and especially adapted to the raising of cotton, corn and truck. The land will be sold in farms of 50 to 500 acres, and can be obtained at very reasonable prices. This corporation also owns **Thirty Million Feet** of yellow pine timber, situated very close to railroad, and very easily accessible. For information, prospectus, &c., write

The Robeson Development Company
LUMBERTON, N. C.

High Class Farming Lands

By the extension of the lines of the Virginia & Carolina Southern Railroad from St. Pauls, N. C., to Elizabethtown, N. C., the capital of Bladen County, a section heretofore without railroad facilities, one of the finest sections of farming lands in eastern Carolina has been opened up along the Cape Fear River. This land is absolutely unsurpassed in the quality of its soil, and is adapted to the raising of all Southern crops, especially cotton, corn, melons and truck.

This section of country is also well timbered, and on account of the connection of this road with the main line of the Atlantic Coast Line at Hope Mills, affords ideal facilities for shipping lumber, &c., to the northern markets. For information, &c., write

A. W. McLEAN, President,
Lumberton, N. C.

GAINESVILLE, GEORGIA

"The Queen City of the Mountains"

Do you know that the new Gainesville and Northwestern Railroad now being constructed from Gainesville to Robertstown, Georgia, will penetrate the largest body of undeveloped hardwood timber east of the Rocky Mountains?

This will make Gainesville the best location for furniture and woodworking plants in the South, situated on the main line of the Southern Railway and the Gainesville Midland Railroad, 53 miles northeast of Atlanta.

It is a fact that Gainesville offers inducements and opportunities unexcelled by any Southern City

To the Manufacturer. Timber, Power, Labor.

To the Healthseeker. Pleasant Climate, Pure Air and Water, Ideal Place to Live.

To the Homeseeker. Splendid Schools, Churches the Best, Low Cost of Living.

Gainesville is the home of BRENAU COLLEGE, the third largest Conservatory of Music in the United States.

Riverside Military Academy located on the banks of the famous Chattahoochee—The coming Prep. School of the South.

For detailed information and descriptive booklet, address

Secretary GAINESVILLE CHAMBER OF COMMERCE
GAINESVILLE, GEORGIA

Cheap Electric Power

Bedford City, Virginia

INDUSTRIES WANTED

Bedford City, Va., offers every advantage to industrial plants generally. Has plenty cheap electric power which is a great help to profitable manufacturing; has good supply of labor and ample raw material of various kinds within easy reach; and is on railroad connecting with all parts of the country and seaports. Good schools, churches, healthful climate and other facilities and comforts which make it a fine place of residence.

Detailed information gladly given by the

Board of Trade Bedford City, Virginia

ESTABLISHED 1865

1912

We beat the "Record"

47 Years of continuous operation.

Methods and equipment fully up to the times.

Machinery of all kinds for every service.

Steel and Iron Work for all types of Structures.

Large stock Beams, Channels, Angles, etc.

Chickasaw Iron Works

MEMPHIS, TENN.

AKERS FIRE PROTECTIVE CO. MEMPHIS, TENNESSEE

Steel Rolling Doors and Shutters, Elevator Doors, Gates and Enclosures, Metal and Wire Glass Windows, Fire Escapes and Ornamental Iron, Fire Extinguishers and Safety Gasoline Cans, Asbestos Protected Metal, Etc.

Use STEEL Trucks

And stop wasting money on Trucks which break up, work loose and require repairing

ALWAYS

We make Trucks, Cars and Systems of any Type in all Steel

FOR HANDLING

Lumber, Clay, Brick, Anything

Tell us what you want to handle

Merry Steel Truck Co.

MEMPHIS, TENN.

Memphis Bridge Co.

Designers, Manufacturers
Contractors

Bridges, Roof Trusses
Structural Steel and Iron

MEMPHIS, TENN.

Timber — Cut over Land — Farms

Our illustrated book, "The Golden Opportunity Place," describes in detail the Mississippi Delta where our holdings are located. It will be sent gratis upon request to anyone who may be interested in Southern lands. Our references: any bank in Memphis.

BARNEY & HINES, Inc.

Central Bank Bldg.

Memphis, Tenn.

KENTUCKY, as well as the other Southern States, offers many opportunities for investment in timber, coal and iron ore lands. We have several large boundaries of this kind ranging in size from 1000 to 100,000 acres. Also some bargains in colonization lands. Locally this is a fine place for plug and smoking tobacco and cigar factories, being in the heart of the dark tobacco district.

A. C. BURNETT, Cadiz, Ky.

SALT, SULPHUR AND FULLER'S EARTH PROPOSITION

We own and control extensive tracts of land in East Texas on which we have found Rock Salt, Native Sulphur and Fuller's Earth. We desire to correspond with parties interested who would develop these holdings upon a business basis. We would sell or lease.

Address Woldert Grocery Co., Tyler, Texas.



COME TO MEMPHIS!

Come to the Southland—come where the commerce of the South and Southwest centers—come where the transportation advantages are unequaled—come where you can get the cheapest raw materials in unlimited quantities—come where labor conditions are right and the home life is ideal—come to Memphis, the heart of Southern industrial opportunity.

WHY MEMPHIS IS SUPREME.

R. G. Dun & Company, attesting the results of Memphis' Industrial Progress, say: "During the year 1910 there were 58 different manufacturing enterprises located in Memphis, 75 jobbers of various lines of merchandise and 641 new industrial or mercantile firms and corporations."

Best Transportation

Memphis makes the freight rates for the South and Southwest. 11 trunk lines, 2 belt lines, and on the Mississippi River.

Cheapest Raw Materials

Memphis is the greatest inland cotton market in the world—is the center of the hardwood supply of America—is surrounded by the most fertile low-priced farming lands on the continent.

Ideal Home Life

Memphis has the best health record among the Southern cities—pure artesian water—perfect sewage systems—and is noted for its commission form of municipal government.

Factory Openings

Memphis needs furniture factories, woodworking mills, implement plants, and allied industries where raw materials in iron, wood or cotton are used—and can assure success to such industries.

Satisfied Labor

Memphis offers to the laboring man a pleasanter home life, easier living conditions, better health, more enjoyable climate, and the finest educative advantages.

Distributing Center

Memphis can deliver goods into 20 large cities and hundreds of small towns in 20 hours or less. This alone makes Memphis the logical location for distributing houses.

Write for These Books

Memphis invites you to share in her prosperity, and asks you to write today for "Factory Facts and Figures," and a complimentary subscription to "The South Today." They give comparative freight rates and tariff advantages—show cost of raw material—describe comparative markets—give wage scales and cost of living in Memphis.

COMMISSIONER, BUSINESS MEN'S CLUB
MEMPHIS, TENN.

Richard C. Huston

Civil and Consulting Engineer

MEMPHIS

JAMES Z. GEORGE

Mem. Am. Soc. C. E.
ADVISORY ENGINEER
Advice, Reports, Appraisals, Engineering Counsel in Suits at Law.
MEMPHIS

The George Co.

Engineers, Constructors
MEMPHIS

The George Public Utility Co.

OPERATORS
BUILD, BUY OR LEASE
All kinds of Public Service Properties
MEMPHIS

Bradshaw-Ward Co.

Consulting Refrigerating Engineers
Designing, Estimating, Contracting

Power Plant Contractors

MEMPHIS

G. Worthen Agee

Analytical Chemist

Cotton Seed products, fertilizers, feeds, water and fuels.

Cement testing

MEMPHIS

W. B. Troy, Jr.

Road Machines
Road Rollers
Rock Crushers
Galvanized Culverts
Tile Machines
Traction Engines
Concrete and Asphalt Mixers

MEMPHIS

F. G. Proutt

MEMBER

American Institute Electrical Engineers

Electrical and Mechanical Engineer

374 RANDOLPH BUILDING

MEMPHIS

J. E. Hollingsworth & Co.

Contractors and Builders

Public Buildings a Specialty

Reinforced Concrete Construction

MEMPHIS

The Allen Engineering Co.

POWER PLANT ENGINEERS

Manufacturers of machinery for the complete equipment of manufacturing plants.

HEAVY DUTY POWER TRANSMISSION APPARATUS

Sales Office
Exchange Bldg.

MEMPHIS

General Office and Works
May and Chelsea Sts.



The quantity of standing timber is practically unlimited

HUSTLING HELENA



The cotton is a beautiful quality

H
E
L
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N
A

The ideal spot for manufacturers, especially those using

LUMBER OR COTTON

TIMBER

Helena has more standing timber along the streams tributary to it than probably any other one point. Practically every kind of hardwood is found, together with 75 per cent. of all the cottonwood in the country.

Helena now has a number of woodworking plants, but the available timber supply makes room for others.

COTTON

The cotton grown in territory tributary to Helena is noted for its length and strength.

It is longer than that raised in any other section of the United States.

Helena now has a cotton mill with 10,000 spindles, two cotton compresses, and three cottonseed oil mills. There is opportunity for further profitable operation in Helena.

Write the Business Men's League for the details

TRANSPORTATION

Helena has the Mississippi River along its eastern edge and five railroads. These are the Iron Mountain, Illinois Central, Missouri & North Arkansas, Arkansas Midland and the Memphis, Helena & Louisville. A projected road—Memphis, Dallas & Gulf—will begin building this year.

THE FIELD

These railroads give immediate access to such important cities as Chicago, St. Louis and Kansas City to the north; to Oklahoma and the west; and to points in Louisiana and Texas to the south.

FREIGHT

Helena's success in drawing new enterprises to the city is largely on account of favorable freight rates. Helena is located at what is regarded the head of deep water navigation on the Mississippi.

FUEL

Coal is very cheap. Illinois and Kentucky coal is brought via river, and Pittsburgh coal is also available.

LABOR

There is an ample supply, with no labor disturbance.

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Helena grew by more than 60 per cent. between 1900 and 1910, and is still growing in a natural way without any boom. The postoffice receipts more than doubled in that period.

It has all the appurtenances of a live American city—splendid homes, churches, library, schools. A new high school costing \$100,000 is now building. Six banks and trust companies with assets of \$5,000,000. Three hotels. Amusement places. And a temperature averaging 78° in summer, and 42° in winter.

Helena itself is a good market for the agriculturist or the truck gardener. The fertile soil pays good dividends.

Helena is a place to live, to work and to profit in. Write for our illustrated book, "Push and Pull."

THE BUSINESS MEN'S LEAGUE, HELENA, ARK.

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The river makes the freight rate

ARKANSAS' BEST CITY



The character of the buildings is splendid

FITZGERALD

GEORGIA

HERE in southern Georgia we have the best climate in the world, the small farmer and the manufacturer of specialties finding labor conditions good, and abundant supply of raw materials at low prices. I will personally assist you in getting well located if you mean business and are looking for a location.

A. B. COOK

PRESIDENT THIRD NATIONAL BANK

AND

MAYOR OF FITZGERALD

W. A. JONES, SHREVEPORT, LOUISIANA

Largest Dealer in Lands and Investments in

NORTH LOUISIANA

invites correspondence with those seeking high class land investments and first mortgages, also with homeseekers.

I handle country property exclusively and make a specialty of farm and timber lands.

Have complete knowledge of Louisiana lands and am thoroughly acquainted with conditions in this state, having been a resident for fifteen years.

Within the past year have sold land to investors and homeseekers from eleven states and have satisfied all.

Have been secretary of The Louisiana Farm Lands Congress for past two years.

Represent non-resident owners and can furnish references.

It is to your advantage to do business with a man on the ground who is entirely familiar with the situation and whose best recommendations are his Satisfied Customers.

Will take pleasure in answering inquiries about any section of Louisiana and no matter how much or little you have to invest, I can help you.

Lands Located Near Shreveport

Second Largest City in Louisiana

35,000 Population

Eleven Railroads

Delightful Climate

Second Largest Gas and Oil Field in the Country

Annual Rainfall of Forty-eight Inches

Good Water

Excellent Schools and Churches

Highest Elevation in State

Forty-seven Wholesale Houses

Centre of Alfalfa and Corn Belt

\$12,000,000 Bank Deposits

This section is a magnificent stock country.

Corn prize for the entire United States was won by a North Louisiana boy at Columbus, Ohio, Corn Show.

There are fine opportunities here for investors to buy large tracts of land to be resold to homeseekers and those wishing only limited acreage.

Send for copy of "Greater Louisiana"

W. A. JONES

Authority on North Louisiana Lands

SHREVEPORT, LA.

Better Than Stocks and Bonds

Is An Investment in Real Estate in
Jacksonville, Fla.

Jacksonville has a population of 80,000. Increase in ten years 103 per cent. Number of buildings erected in the past eleven years is eleven thousand.

Real Estate investments in Jacksonville pay from 8-15 per cent., in addition to a rapid increase in value. Let us submit something good.

We can lend your surplus in sums of \$2000 up at from 6½—8 per cent. net to you. Write

RALEY-HAMBY COMPANY

212 Hogan Street

JACKSONVILLE, FLA.

Members

Board of Trade Real Estate Exchange Southern Commercial Congress

Reference: Barnett National Bank of Jacksonville, Fla.

Pollard & Bagby

Richmond, Virginia

REAL ESTATE
IN ALL ITS BRANCHES

Negotiate large loans

Sell farms all over Virginia.

INVEST IN

Southern Timber Lands
Colonization Lands
Agricultural Lands
FOR BIG RETURNS

Increase in land values alone in last ten years 11.8% per year, not including products. Prospects for next ten years far better.

Manufacturing Sites and Business Property

FOR MOST ANY USE IN

RICHMOND

"The Queen City of the Sunny South"

and Other SOUTHERN Cities, for Sale

Those having money to invest or to lend on large or small properties at 5% to 6% net are respectfully invited to confer with us as to their needs.

McCLURE-DAVENPORT-TAYLOR CO., Inc.
RICHMOND, VIRGINIA

Timber and Farm ——Lands——

IN LARGE AND SMALL TRACTS

Large tracts cut-
over land for col-
onization purposes.

Brobston & Company

Atlantic National Bank Building

JACKSONVILLE, FLORIDA

J. J. FRETWELL

DEALER IN

Real Estate, Real Estate Mortgages
and Southern Securities

Office in Peoples Bank Building

Correspondence Solicited

ANDERSON, S. C.

Shand Engineering Co.

COLUMBIA, S. C.

Cotton Mill Engineering.

Water Power

Reports a Specialty

Farm and Timber Lands

In the best parts of the South

Each farming tract has had our careful personal investigation before we offer it for sale.

Each piece of timber has been estimated by a capable cruiser, whose certificate is furnished and guaranteed by us.

Complete description furnished on application.

We are always in the market to consider the purchase of farm and timber tracts of genuine merit.

We refer by permission to the Continental
National Bank or the Farmers' Trust Co.,
Indianapolis.

THE SHERRICK LAND CO.

INDIANAPOLIS, IND.

Irrigation and drainage will within a few years transform millions of acres of waste South Atlantic lands into the most productive areas on earth. We are prepared to handle this class of work.

Cut-Over Lands For Sale

Dierks Lumber & Coal Co.

Have for sale several thousand acres of cut-over lands located in Sevier and Howard Counties, Arkansas.

FRED. J. LEEPER, Agent,
De Queen, Ark.

The Choctaw Lumber Co.

Offer for sale their cut-over lands located in McCurtain County, Oklahoma.

JOHN CRAIG, Agent,
Broken Bow, Okla.

The above lands are suitable for farming, fruit growing, truck gardening and stock raising. Large quantities of Tomatoes, Strawberries, Canteloupe, Peaches and other small fruits and vegetables are now being raised on same class of lands in counties named.

These lands are offered at very low prices and easy terms to actual settlers.

James C. Lawrence

CONSULTING CHEMICAL ENGINEERS

AND

INDUSTRIAL CHEMISTS

FOREST PRODUCTS:

Wood Distillation, Turpentine, Pulp and Paper, Preservation, Alcohol, Tanning, Wood Waste.

MUNICIPAL PROBLEMS:

Water Supply, Sewage, Paving Specifications and Material, Expert Testimony.

PLANTS AND PROCESSES:

Acid, Alkali, Fertilizer, Oil, Mineral, Clay and other industries.

UTILIZATION OF WASTES:

Special Investigations and Reports on Waste of all kinds.

The combined experience of the Associates of
this office now aggregates over Forty Years.

MEMPHIS, - TENN.

Structural

BARTLETT & RANNEY
CIVIL ENGINEERS

Irrigation

Municipal Engineering

SAN ANTONIO, TEXAS

THE MANSFIELD ENGINEERING CO.

ENGINEERS AND CONTRACTORS

Interurban Railways and Water-Power Developments a Specialty

INDIANAPOLIS, IND. - - - (The Interurban Centre.)

Shenandoah Valley Farms, Timber Lands and Orchards

Located in the

Famous RED APPLE BELT of Virginia

E. W. Barger & Company.

Waynesboro, Va.

OLD VIRGINIA

HOMES and FARMS FOR SALE

Write for Catalogue of the most select
properties in the State. Established 1874

R. B. CHAFFIN & CO., Inc.

Richmond, Virginia

TIMBER LANDS

Now is the time to buy, as prices are going up every day. Choice hardwood tracts are getting scarce, but we have for sale a number of first-class propositions in both small and large tracts. We will not send you on any wild goose chase, when you deal with us. Our estimates are by experienced cruisers and are dependable. We also sell farms and plantations. Write us for descriptive lists.

W. K. BURTON & CO.

116 Madison Avenue

MEMPHIS, TENN.

Mill Architect and Engineer

—SPECIALTY—

Textile Mills and Water

Power Developments

J. E. SIRRINE

GREENVILLE, S. C.

ESTABLISHED 1881

Froehling & Robertson

Richmond
Testing Laboratory

ANALYTICAL AND CONSULTING
CHEMISTS AND CHEMICAL
ENGINEERS

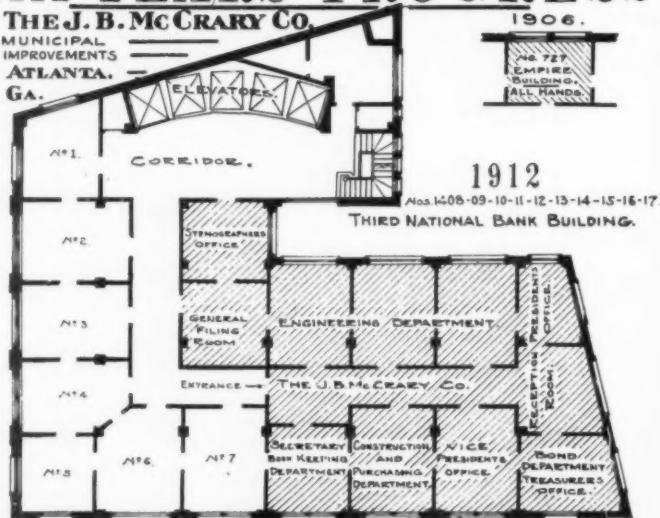
Chemical and bacteriological tests of public water supplies; analyses of mineral and boiler waters, coal and coke, food products, ores, etc. Specialists on cement and concrete materials. Physical inspection of cement, iron and steel, etc. Design and erection of water softening plants. Examinations and reports on mineral properties.

OFFICE AND LABORATORIES

2 N. 9th Street, Richmond, Va.

SIX YEARS PROGRESS

THE J. B. McCRARY CO.
MUNICIPAL
IMPROVEMENTS
ATLANTA,
GA.



The
J. B. McCRARY CO.

Engineers

ATLANTA, GA.



A Record for Speed

On a Dam and Power House built for the Chippewa Valley
Light & Power Co., on the Red Cedar River
at Cedar Falls, Wisconsin.

Contract signed	Feb. 1, 1910
Superintendent arrived on the work.....	Feb. 9, 1910
Work begun	Feb. 10, 1910
Machinery for construction arrived.....	Feb. 21, 1910
Coffer Dam begun.....	Feb. 25, 1910
First concrete laid.....	Apr. 19, 1910
First section completed and river turned.....	June 13, 1910
Superintendent left work.....	Sept. 20, 1910
Dam completed by Asst. Superintendent (9 months after signing contract).....	Nov. 1, 1910
Current turned on.....	Dec. 1, 1910
Working force disbanded.....	Dec. 6, 1910
Current furnished to customers (10 months and 15 days after signing contract).....	Dec. 15, 1910
Yardage rock excavation.....	12,326 cu. yds.
Yardage concrete	16,353 cu. yds.
Number of units in Power House.....	4 with 2 exciters
H. P. of each unit.....	3,600 H. P. under 48' head
Length of dam, including Power House.....	500'
Height of dam above river bed.....	55'
Height from bottom of wheel pit to roof of Power House.....	61'
Available Head created.....	51'

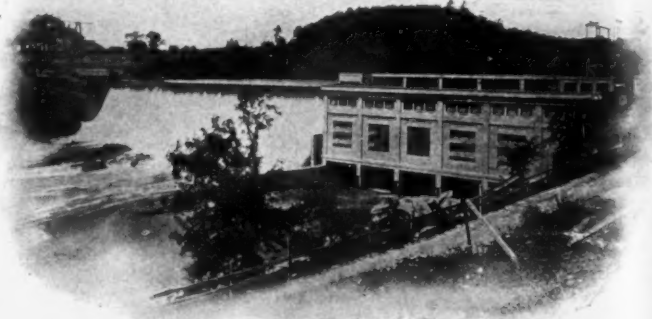
Respectfully submitted,

Ambursen Hydraulic Construction Company
Engineer-Constructors

88 Pearl Street

BOSTON, MASS.

All inquiries from Canada should be addressed to
Ambursen Hydraulic Construction Co. of Canada, Ltd.
405 Dorchester St., West Montreal, P. Q.



WE ARE PIONEERS IN THE RECLAMATION OF SWAMP and OVERFLOWED LANDS

AGRICULTURAL POSSIBILITIES AS RESULT OF DRAINAGE.

Following the experience of European countries, our nation is rapidly awakening to the fact that her most fertile and lasting soil is to be found in the low and overflowed districts, where for centuries the rich washings from the higher lands have found their way. The reclamation of these lands, located, as they generally are, in the midst of developed surroundings, present the greatest opportunity of today for the farmer or real estate investor.

OUR SERVICE AND EXPERIENCE AT YOUR COMMAND.

After twenty years of practical and successful drainage experience, we are now operating thirty large dredges in the Central and Southern States, some engaged in cutting outlets for inland marshes, some in straightening river channels or building levees to prevent overflow, and others in the reclamation of gulf coast lands. We aim to operate the most modern type of equipment and refer with pride to our reputation for good work, quickly done. Correspondence solicited with any one interested in this class of work, touching either plans or cost of same. Special attention given to contracts with drainage districts.

INVESTMENT OPPORTUNITIES IN UNDEVELOPED LAND OR DRAINAGE BONDS.

We are continually in touch with drainage projects seeking financial assistance, which offer not only absolute security, but liberal profits for the capital employed.

Through our practice of taking approved bonds in the payment for work, we can be of service to either the seller or broker interested in this class of security. During the past year we have either purchased or negotiated \$700,000.00 in drainage bonds, and in no instance has default in payment of interest or principal occurred in connection with bonds which we have handled.

LOWER LOUISIANA DELTA LANDS.

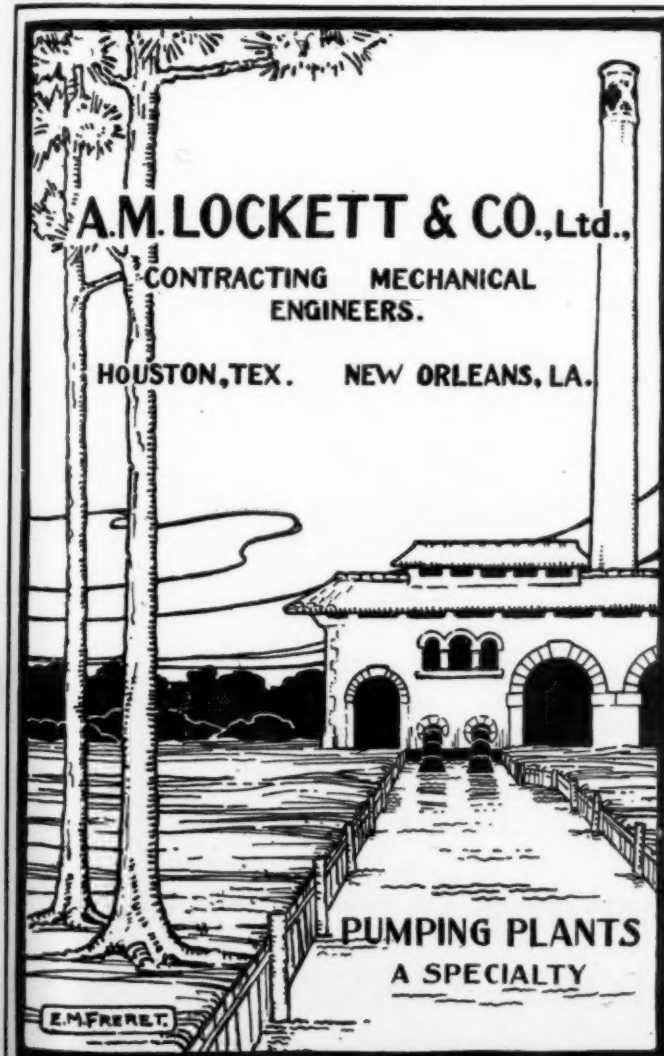
The junior member of this firm has given special personal attention for some years to the reclamation of these gulf coast alluvial lands, and, aside from being one of the first to install dredges on this class of work, has been identified as President and Manager of the ST. CHARLES LAND COMPANY since its organization. This company is now placing on the market several thousand acres of choice land advantageously located about twenty miles southwest of New Orleans, and to those interested in this field of drainage operations we especially invite inspection of the perfect reclamation here obtained.

Prompted by the unquestionable value arising from the drainage of the lower Delta lands, we have recently extended our facilities to handle all work required in their reclamation, including not only dredge work, but excavation of surface ditches and the installation of pumping plants, and are prepared to submit bids on the acre basis or otherwise, thus contracting to prepare the wet prairie in condition suitable for the plow.

Special Attention Given to All Correspondence, and Estimates Cheerfully Furnished When Required.

R. H. & G. A. McWILLIAMS, Drainage Contractors

Main Office: 1600-04 Steger Bldg., Chicago, Ill.



A.M. LOCKETT & CO., Ltd.,
CONTRACTING MECHANICAL
ENGINEERS.
HOUSTON, TEX. NEW ORLEANS, LA.

**PUMPING PLANTS
A SPECIALTY**

E.M. FRERET.

WE give below a list of the more important centrifugal pumping plants we have installed for irrigation and drainage; the capacities are given in gallons per minute:

	GALS.
Southwestern Rice & Canal Co., Jennings, La.....	35,000
Jennings Canal Company, Jennings, La.....	25,000
Matagorda County R. & I. Co., Bay City, Texas, 1st Installation	70,000
Matagorda County R. & I. Co., Bay City, Texas, 2d Installation	50,000
Brazoria Irrigation Co., Duke, Texas, 2 Lifts, total.....	70,000
Brazoria Irrigation Co., Duke, Texas, 2d Installation.....	10,000
Old River Irrigation Co., Wallisville, Texas, 1st Installation....	25,000
Old River Irrigation Co., Wallisville, Texas, 2d Installation....	35,000
Cosner & Ziegler, Lake Charles, La.....	35,000
R. Onishi, Pearce, Texas.....	20,000
Cane & Rice Belt Irr. Co., Houston, Texas, 1st Lift.....	100,000
Can & Rice Belt Irr. Co., Houston, Texas, 2d Lift.....	100,000
North American Land & Timber Co., Lake Charles, La.....	50,000
San Jacinto Rice Co., Beaumont, Texas.....	35,000
Sabine Canal Co., Vinton, La.....	50,000
American Rio Grande L. & Irr. Co., Mercedes, Texas.....	70,000
La Feria Irrigation Co., Mercedes, Texas, 1st Lift.....	35,000
Bay Island Drainage District, New Boston, Ills.....	200,000
Moore's Bluff Rice Co., Dayton, Texas, 1st Installation.....	36,000
Moore's Bluff Rice Co., Dayton, Texas, 2d Installation.....	36,000
Louisiana Rio Grande Canal Co., MacAllen, Texas, 2 Lifts....	70,000
Morgan City Land Co., Morgan City, La.....	55,000
White Lake Land Co., Gueydan, La.....	130,000
E. O. & E. Richardson, Mitchiner, La.....	10,000

A. M. Lockett & Co., Ltd.
Contracting Mechanical Engineers
NEW ORLEANS, LA. HOUSTON, TEX.

CLINCHFIELD PORTLAND CEMENT

THE ACKNOWLEDGED
NEW STANDARD OF THE SOUTH

In Quality and Economy
DUE TO ITS
Uniformity, Fineness, Strength and Low Magnesia



Daily Capacity, 3000 Barrels

Used by the largest Engineers, Architects and Contractors in the United States
on the most stupendous work ever undertaken in the South.

YOUR ORDERS ARE SOLICITED

Clinchfield Portland Cement Corporation

Office and Mills, KINGSPORT, TENN.



"Of Proven Worth"

Royal Portland Cement

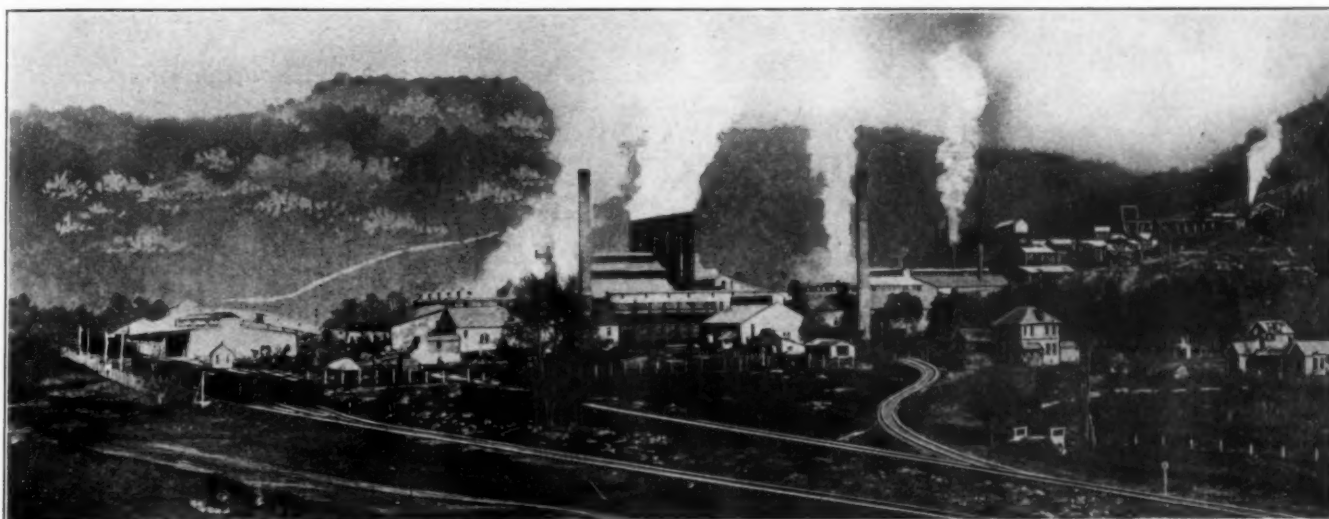


With the only plant in the South using the wet process—the only sure method of securing absolute uniformity of product;

With unlimited quantities of raw materials right at the mill;

With a mill equipped with the most modern machinery, and every department under the watchful eye of an expert,

No better product is possible than Royal Portland Cement.



The adaptability of Royal Portland Cement for every class of construction is well shown by the following important work in which it has been used:

RAILROAD

Nashville, Chattanooga & St. Louis; Cincinnati, New Orleans and Texas Pacific; Alabama Great Southern; Mississippi Central; Louisville & Nashville; Seaboard; Southern Railway.

WATER POWER

250,000 Barrels, Lock and Dam, Tenn. River Power Co. at Hales Bar, Tenn. 150,000 Barrels, Dam, East Tenn. Power Co., Ocoee, Tenn. 20,000 Barrels, Dam at Redmond, N. C., North Carolina Power Co. 150,000 Barrels, Dam, Georgia Power Co., Tallulah Falls, Ga. 50,000 Barrels, Dam, Tenn. Coal, Iron & R. R. Co., Ensley, Ala.

MUNICIPAL

All classes municipal work in Chattanooga, Nashville, Memphis, Atlanta, Birmingham, New Orleans, Pensacola, Mobile, and hundreds of smaller places throughout the South.

FEDERAL POST OFFICES

Asheville, N. C.; Chester, S. C.; Anderson, S. C.; Valdosta, Ga.; Gainesville, Ga.; Marietta, Ga.; Dalton, Ga.; Americus, Ga.; Gadsden, Ala.; Dothan, Ala.; Columbia, Tenn.; Newnan, Ga.; Meridian, Miss.; Gulfport, Miss.; Griffin, Ga.

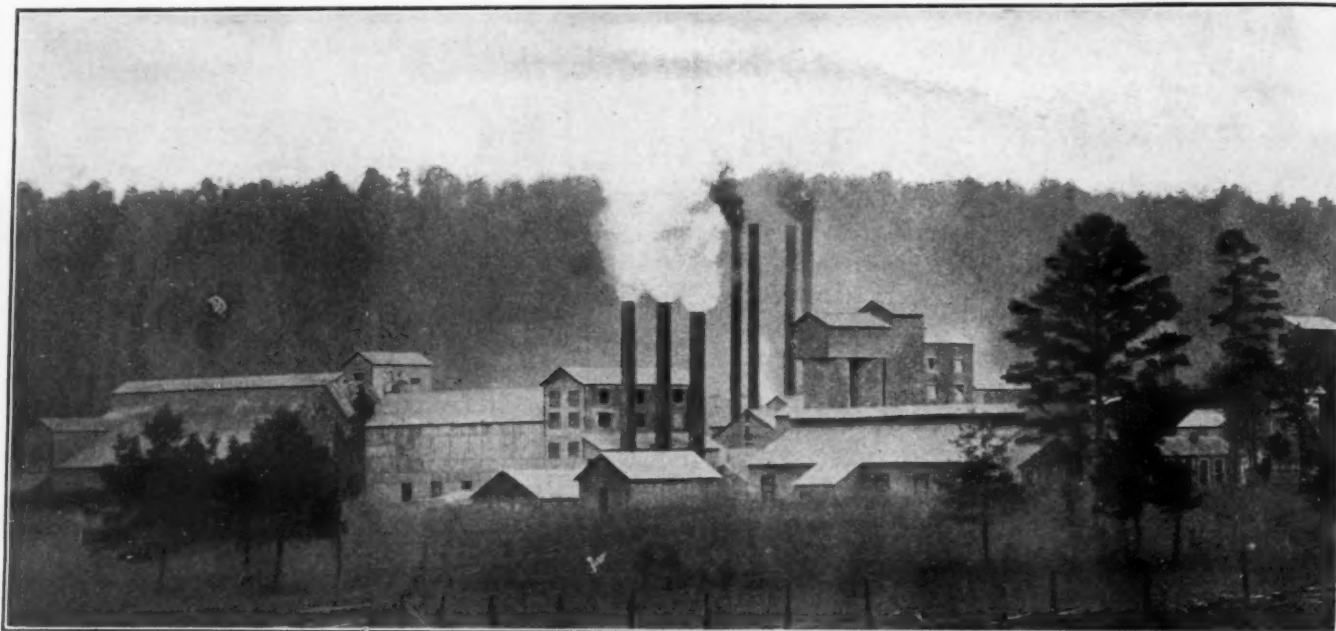
REINFORCED CONCRETE BUILDINGS

San Carlos Hotel, Pensacola, Fla.; Cotton Exchange Building, Memphis, Tenn., the largest office building ever built in Memphis; Gatins Apartments, Atlanta, Ga.; Adair-McCarty Building, Atlanta, Ga.; Hermitage Hotel, Nashville, Tenn.; Legal Building, Asheville, N. C.; Union Station, Memphis, Tenn.; Y. W. C. A. Building, Nashville, Tenn.; Police Station, Memphis, Tenn.; Court House, Murfreesboro, Tenn.; State Normal Schools, Murfreesboro, Johnson City and Memphis, Tenn.; Transformer Station, Tenn. River Power Co., Chattanooga, Tenn.; Floors in Y. M. C. A. Building, City Hall and Grand Hotel, Chattanooga, Tenn.; Randolph Rose Residence, Chattanooga, Tenn.; U. S. Penitentiary, Atlanta, Ga.; Miss. Normal Schools, Hattiesburg, Miss.; Imperial Printing Co. Building, Atlanta; Forsythe Theater, Atlanta; Capital City Club, Atlanta; Elks' Club, Atlanta.

Royal Output 1,500,000 Barrels Annually

DIXIE PORTLAND CEMENT CO.

Sales Office, James Building, Chattanooga, Tenn.



“Standard” Brand PORTLAND CEMENT

On Market 5 Years

A Few Important Contracts in which Standard Brand
Portland Cement was Used

	BBLS.		BBLS.
Tenn. Coal, Iron & R. R. Co., Ensley Ala.	200,000	Imperial Hotel, Atlanta, Ga. (Reinforced Concrete)	4,000
Goat Rock Dam, Columbus, Ga.	140,000	Pensacola Jail, Pensacola, Fla. (Reinforced Concrete)	4,000
So. Ry., C. of Ga. Ry., and A. G. S. Ry.	50,000	Tri-State Hospital, Memphis, Tenn. (Reinforced Concrete)	3,000
Dam, Tenn. Coal, Iron & R. R. Co., Ensley, Ala.	50,000	Advertiser Bldg., Montgomery, Ala. (Reinforced Concrete)	3,000
Dillingham Street Bridge, Columbus, Ga.	30,000	University Bldg., Tuscaloosa, Ala.	3,000
American Wire and Steel Co., Corey, Ala.	10,000	Brown-Marx Bldg., Birmingham, Ala.	3,000
Tunnels at Ropers, Ala. (Reinforced Concrete)	10,000	University Bldgs., Auburn, Ala.	2,000
Government Post Office, Atlanta, Ga.	3,000	Government Forts, Atlanta, Ga., and Pensacola, Fla.	2,000
Atlanta Journal Bldg., Atlanta, Ga. (Reinforced Concrete)	4,000		
Capital City Club, Atlanta, Ga. (Reinforced Concrete)	4,000		

Present Capacity, 500,000 Barrels Annually
WILL DOUBLE DURING 1912



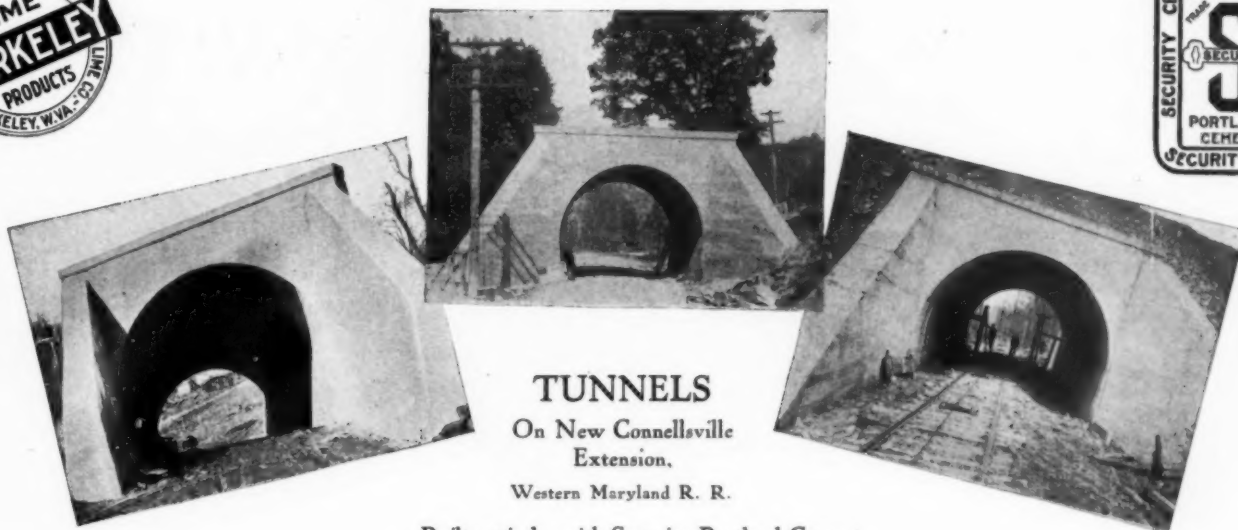
Standard Portland Cement Co.

Works: Leeds, Ala.

General Sales Office
BIRMINGHAM, ALA.

J. I. McCANTS
Sales Manager





TUNNELS

On New Connellsville
Extension.

Western Maryland R. R.

Built entirely with Security Portland Cement.



CIVIL SERVICE BUILDING.
WASHINGTON, D. C.

Alca Lime replaced non-staining Portland Cement
for Brick Mortar.

"SECURITY" MEANS QUALITY and SERVICE

The satisfactory results on Government, Municipal and important Private works in Baltimore, Washington and contiguous territory, necessitating increasing output to 2,000 barrels DAILY, is our strong evidence of QUALITY.



WOODWARD BUILDING.
WASHINGTON, D. C.

Alca Lime used for Brick Mortar.

Four railroads, i. e., Pennsylvania, Baltimore & Ohio, Norfolk & Western and Western Maryland Railways, plus a plant storage capacity of 100,000 barrels, emphasize our claim to SERVICE. Every barrel guaranteed to meet Standard Specifications. Especially adapted for cold weather work.

BERKELEY HYDRATE

("The Lime You'll Eventually Use")

The Essence of Lime in the Finest Form Makes Mortars and Concretes Waterproof, Lightens and Warms the Color Tone. The Ideal Lime for Agricultural Use.

"ALCA" LIME

(Trade Mark)

A perfect and most economical cementitious material for all-around use in mortars, stuccos, and in plasters, inside and outside.

Prepared with and without hair.

A reasonably quick-hardening, highly plastic, hydrated lime, ready for immediate use for all purposes.

All sizes crushed stone for concrete and road work, 1500 tons daily capacity.

Our Engineering Department Will Solve Your Problems.

Ask your dealer or write us for prices and interesting literature.



Security Cement & Lime Company
BALTIMORE WASHINGTON PITTSBURGH



Alpha Portland Cement



Is made from the best rock in the famous Lehigh Valley cement belt and is absolutely pure and unadulterated.

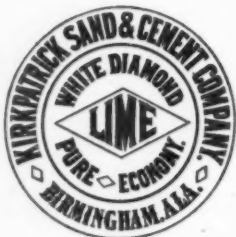
We guarantee every barrel we ship and will gladly quote prices on any quantity.

Annual output: 7,000,000 barrels.

Write for our handsomely illustrated book. Sent free.

Alpha Portland Cement Company

22 Centre Square, EASTON, PA.—Savannah Office: National Bank Bldg.



SAND AND GRAVEL

Crushed Stone - Building Stone



The sand and gravel pits of the Kirkpatrick Sand and Cement Company, located in the States of Georgia and Alabama, have practically an unlimited capacity. Since the year 1886, this Company has enjoyed the reputation of being in a position to promptly take care of all orders placed with them. Their sand and gravel pits in the State of Georgia are located as follows: Howard, Ga., on the Central of Georgia R. R., Junction City, Ga., on the A. B. & A. R. R., and the output of the Bull Creek Sand & Gravel Co. at Bull Creek, Ga., on the Central of Georgia R. R.

Sand and gravel pits located in the State of Alabama are as follows: Fremont, Ala., Coosada, Ala., Jackson Lake, Ala., Epes, Ala. and Gate City, Ala.

Sand and gravel pits also located on the St. Louis and San Francisco R. R. between Birmingham and Memphis, and other roads leading into the Birmingham district.

Owing to the convenient location of our sand and gravel pits, we can supply sand and gravel in the most economical way to any part of the south.

AGENTS FOR

COOSA PORTLAND CEMENT

A FEW BUILDINGS IN WHICH "COOSA" CEMENT WAS USED

Government Post Office, Greenwood Miss.
Government Post Office, Rome, Ga.
Government Post Office, Gadsden, Ala.
Government Post Office, Newberry, S. C.
American Trust (20 Story), Birmingham, Ala.
Fulton Co. Court House, Atlanta, Ga.

Sewerage Disposal Plant, Atlanta, Ga.
County Jail, Athens, Ala.
Dempsey Hotel (8 Story), Macon, Ga. (Re-enforced)
Wire Plant, Amer. S. & W. Co., Corey, Ala.
Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Government Light House, Mobile, Ala.

WRITE FOR ESTIMATES

Kirkpatrick Sand & Cement Co.
BIRMINGHAM, ALA.



20TH CENTURY PRODUCTS

Made from the purest raw materials, in the most modern plants and under the most skilful supervision in the world.

TIDEWATER PORTLAND CEMENT

Finest ground cement in the South. Low in Magnesia Pleasing in Color. Always Sound and Uniform.

Over 100,000 barrels of Tidewater sold for

Government, State, Municipal and Railroad Work.

TIDEWATER HYDRATED LIME

For building and agricultural purposes. High in calcium oxide. Plastic working. Will make the strongest mortar. Used for fertilizing, will produce results superior to all other limes.

SOLD ONLY BY LIVE DEALERS

TIDEWATER PORTLAND CEMENT COMPANY

806-809 KEYSER BLDG., BALTIMORE, MD.

Works, Union Bridge, Md.



A FEW REFERENCES

Masonic Temple.....Waco, Tex.
Indianola Building.....Muskogee, Okla.
St. Stanislaus College.....Bay St. Louis, Miss.
Wood and Mizza Building.....Meridian, Miss.
Carnegie Library.....Eufaula, Ala.
Bank of Wetumpka.....Wetumpka, Ala.
State Capital.....Montgomery, Ala.
Standard Club.....Montgomery, Ala.
Southern Club.....Birmingham, Ala.
J. Blach & Sons.....Birmingham, Ala.
Gunn-Gambill Drug Co.....Birmingham, Ala.
U. S. Custom House.....Selma, Ala.
U. S. Custom House.....Bessemer, Ala.
U. S. Custom House.....Gainesville, Tex.
U. S. Custom House.....Ft. Smith, Ark.
Alabama Hotel.....Anniston, Ala.
New Florence Hotel.....Birmingham Ala.
Gatin Hotel.....Atlanta, Ga.
McLester Hotel.....Tuscaloosa, Ala.
San Carlos Hotel.....Pensacola Fla.
County Court House.....Meridian, Miss.
County Court House.....Montgomery, Ala.
County Court House.....Columbiana, Ala.
Odd Fellows Home.....Cullman, Ala.
State Charity Hospital.....Jackson, Miss.
L. & N. Depot.....Birmingham, Ala.
Central National Bank.....St. Petersburg, Fla.

SOUTHERN MOSAIC TILE CO.

OUR SPECIALTIES

Ceramic, Encaustic and Terrazzo Tile Floors

Vitrolite Glass Wainscoting For wainscoting, bath-showers, hall, kitchens, lavatories, operating-rooms, and where sanitary conditions are desirable.

Vitrolite is a milk-white slab glass of uniform color, free from blemish, of high polish and specially tempered. 3-16 to 3/4-inch thick. Single slabs as large as 8 x 5 feet. Absence of joints (different from tile) combined with Absolutely Non-absorbent Qualities of Glass, and the Highly Reflective Surface of Vitrolite, renders it far superior to any method of wall-covering where Sanitary Conditions are desired. Moderate cost.

Some few uses for VITROLITE—Pastry boards, table tops, sink backs, prescription counters, dentist trays, shelving, surgical tables.

Sole agents for the States of Florida, Alabama, Mississippi and Texas. Samples and estimates on request.

SOUTHERN MOSAIC TILE CO.

319 CHAMBER OF COMMERCE BUILDING, BIRMINGHAM, ALABAMA

PHOSPHATE ROCK

QUOTATION

Furnished for Immediate or Future Delivery

ON

HIGH GRADE
SOUTH CAROLINA
FLORIDA LAND PEBBLE
TENNESSEE BROWN OR BLUE

ALL GRADES

All Rock Washed and Dried by Most Improved Methods

Charleston, S. C. Mining and Manufacturing Company

MT. PLEASANT, TENN.

Prompt Shippers

CHARLESTON, S. C.

INTERNATIONAL AGRICULTURAL CORPORATION

Offer BULK ACID PHOSPHATE for shipment from
following points:

Americus, Ga.	Cincinnati, Ohio	Florence, Ala.	Montezuma, Ga.
Athens, Ga.	Columbia, S. C.	Hartsville, S. C.	Nashville, Tenn.
Atlanta, Ga.	Columbus, Ga.	Lancaster, S. C.	Savannah, Ga.
Augusta, Ga.	Dublin, Ga.	Laurel, Miss.	Spartanburg, S. C.
Buffalo, N. Y.	Evergreen, Ala.	Montgomery, Ala.	Wilson, N. C.

MINERS OF

Florida and Tennessee Phosphate Rock

68%, 70%, 72%, 75%

IMPORTERS AND SELLERS OF

All Grades of Potash, Nitrate of Soda

MAIN OFFICE

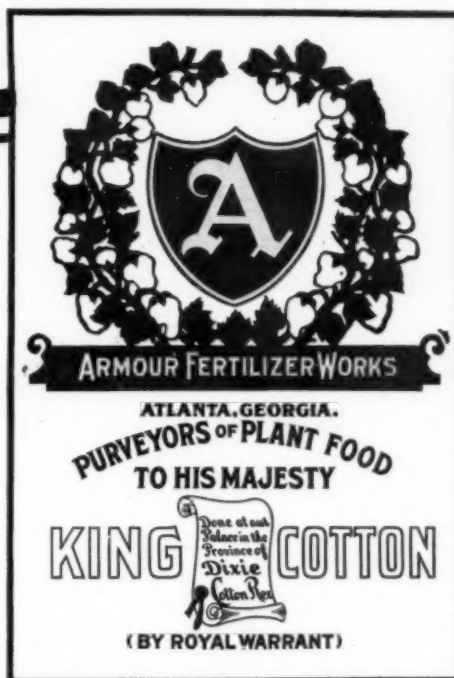
165 Broadway, N. Y. City

SOUTHERN HEADQUARTERS

Walton Building, Atlanta, Ga.

OUR BRANDS

**Helmet
Shield
Sunrise**



OUR BRANDS

**Helmet
Shield
Sunrise**

THIRTY years ago the cotton producing States used in the aggregate about 350,000 tons of commercial fertilizers.

During the season of 1910-1911 this same group of States used 3,944,911 tons.

In the year 1895 one of our representatives came back to the South to introduce the ARMOUR BRANDS of FERTILIZER.

It had been thoroughly shown in the West that goods deriving their ammonia from animal sources possessed greater staying and finishing qualities on all grain, fruit and truck crops. We knew the same results would follow their use under cotton.

Shipments were made from Kansas City. Freights were enormous, and our farmers were not so quick to take on new ideas as now. However, a few tons were placed here; a carload there; and a foothold was gained.

Our Atlanta factory—the first built by us in the South—was completed in 1900, and each succeeding year has seen the erection of one or more plants made necessary to care for the increasing demand.

All along we have clearly recognized the fact that our interests and the interests of the planter were identical. While urging the merits of our fertilizers we have never failed to stress the absolute necessity of seed selection, careful and thorough preparation and cultivation. We have always pointed out that the full benefits of fertilizer could not be secured without these.

A good many years ago we began a campaign to prove that fertilizer should be applied to the growing crops, and not all placed in the ground at or shortly before planting cotton. We knew that this was a radical change from the old method, and anticipated the objections that would be raised.

Some said it was too radical and they feared it would not pay.

We placed before them the testimony of reputable up-to-date farmers showing that it *did* pay and *pay handsomely*.

Others said labor was scarce and they did not have time.

We replied: "It costs just as much to prepare, plant and cultivate one acre as another. Concentrate, use less ground and better methods—make as much cotton on *one* acre as you have formerly made on *three*—and we referred to other men who were doing this by the practice we were urging."

We said: "Fertilizer is a plant food. Feed your crops as you would your stock. You do not eat enough in one day to last a month, nor do you feed your stock that way. Why follow such a plan, then, in feeding your crops?"

It is now an accepted fact that divided applications of fertilizer produce the best yields. By this method a thousand pounds of fertilizer per acre may be safely used on cotton, giving the farmer the benefit of increased production and decreased cost per pound impossible to secure under the old way.

Another campaign we have successfully undertaken has been to show that one source of ammonia is not sufficient, but that the ideal fertilizer should be so compounded as to furnish this vital element to the crop from the bursting of the seed to the gathering of the harvest. Practice has proved this theory to be correct and the ARMOUR BRANDS derive their ammonia from Blood, Tankage, Bones, Nitrates, etc.

Our every effort has been constructive. As one reward of merit we refer to the warrant:

*"Purveyors of Plant Food to His Majesty
KING COTTON."*

ARMOUR FERTILIZER WORKS

FACTORIES

CHICAGO, ILL.
BALTIMORE, MD.
ATLANTA, GA.
CHROME, N. J.

WILMINGTON, N. C.
BUENA VISTA, VA.
OMAHA, NEB.
FORT WORTH, TEX.
LOUISVILLE, KY.

AUGUSTA, GA.
SAVANNAH, GA.
JACKSONVILLE, FLA.
NASHVILLE, TENN.

NEW ORLEANS, LA.

LOS ANGELES, CAL.
KANSAS CITY, KANS.
E. ST. LOUIS, ILL.
SIOUX CITY, IA.



The Part Played by



Fertilizers in Southern Agriculture



THE measure of a nation's progress is its consumption of fertilizers. The country that does not steadily increase the fertility of its soil will grow poorer on every crop produced, for it will be living on its capital instead of its income. No man can continue to draw on his bank account indefinitely unless he puts in new deposits.

The farmer who crops without fertilization, that is, without putting back in his bank account at least as much as he takes out, will eventually "go broke."

Southern farmers are heeding these truths and annually improving their soil. They are now using nearly 4,000,000 tons of fertilizers a year, or three times as much as they used ten years ago.

The wonderful advance in diversified agriculture throughout the South, the great increase in corn growing and trucking, are largely due to the increased use of fertilizers. Instead of exhausting their principal—their soil—Southern farmers are now annually making larger deposits than they are drawing out, and thus are increasing their wealth as never before.

Broadly speaking, it may be said that civilization itself rests upon the use of fertilizers to a greater extent than upon any other industry. The fertilizer trade is, therefore, the foundation of a nation's progress.

For these reasons the merchant, the manufacturer and the banker are just as deeply interested in soil restoration, through the use of fertilizers, as are the farmers themselves. There is practically no limit to the agricultural potentiality of the South, provided intensive farming and the free use of the highest grade of fertilizers be universally adopted by this section. Every man who is interested in the prosperity of the South, regardless of his business or his profession, must be interested in these two fundamental facts—intensive farming and the restoration of soil fertility, upon which all progress will depend.

This company, one of the leading fertilizer manufacturing companies of the United States, has thoroughly modern and up-to-date plants at

BALTIMORE, MD.

SPARTANBURG, S. C.

TARBORO, N. C.

MACON, GA.

COLUMBIA, S. C.

COLUMBUS, GA.

NORFOLK, VA.

MONTGOMERY, ALA.

It also owns its own phosphate mines at Bartow, Fla., from which it draws the phosphate rock needed in its many plants.

With its record of many years in the production of high-grade fertilizers, and its ample capital, it is in a position to materially assist the farmers of the South in the restoration of the soil and thus in the increase of their wealth.

F. S. ROYSTER GUANO COMPANY

MANUFACTURERS AND IMPORTERS OF

FERTILIZERS AND FERTILIZER MATERIALS



GENERAL OFFICES:

Royster Building,

NORFOLK, VA.



Inert NITROGEN separated from the Oxygen of the atmosphere and put through an intricate electrical process is here presented to AGRICULTURE in a highly available and attractive form for fertilizing.

CYANAMID

atmospheric nitrogen

CYANAMID is now a product of world wide manufacture and use. It is manufactured for the American Trade by the American Cyanamid Company at Niagara Falls, Ontario, and other plants are located—

4 in Germany	3 in Italy	1 in Switzerland
1 in France	1 in Norway	1 in Sweden
	1 in Japan	

CYANAMID is a *Fine Bluish Black Powder*

Made from Calcium Carbide and Nitrogen

CYANAMID CONTAINS 18-22% AMMONIA, one of the essential plant foods. The Nitrogen (ammonia) becomes available in the soil in forms identical with the form of *Ammonia* in the old standard of excellency, *Peruvian Guano*.

CYANAMID contains 20% *Slaked Lime*. The agricultural value of lime has been known for centuries. We now know that lime makes possible the existence in the soil of thousands of nitrifying bacteria, Nature's *Nitrogen Factories*.

CYANAMID contains 12-14% *Carbon Black*, which will absorb waste products excreted by plants, otherwise harmful to them.

CYANAMID will make *Damp* acid mixtures *Dry* and *Friable*. No aging is required.

CYANAMID will *Preserve Bags* by neutralizing free acid in mixtures.

CYANAMID in acid phosphate mixtures *With Nitrate of Soda* prevents loss of nitrate nitrogen.

CYANAMID by numerous field experiments *Ranks* with the *Best* as a *Crop Producer*.

CYANAMID gives *Manufacturers* improved operating conditions, and gives *Farmers* better crops.

CYANAMID PRICES ARE RIGHT.

CYANAMID is manufactured the year round. It is always in storage.

See your broker or write us for information.

Wire for Prices

AMERICAN CYANAMID COMPANY

KEYSER BUILDING

BALTIMORE, MD.

The AMERICAN KRON SCALE



RAILROAD FREIGHT SCALE
Capacity 6000 to 12000 Lbs. Tare Beam 300 to 1000 Lbs.

AUTOMATIC
INSTANTANEOUS
ACCURATE
CONSTANT

NO SPRINGS

USED BY
30 Railroads and Express Co.'s

NO MISTAKES

ONE OPERATION

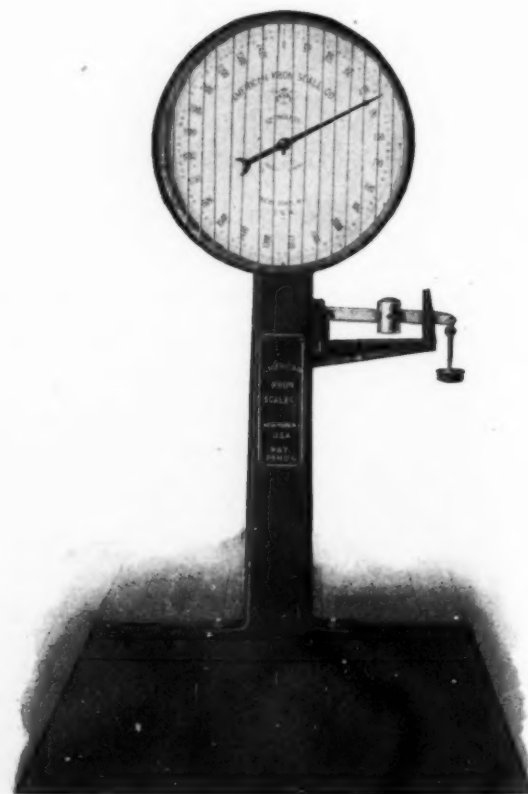
LOAD AND LOOK AT DIAL

SOLD BY
SPENCER OTIS CO.

CHICAGO

ST. LOUIS

Details and Prices Furnished on Application



LIGHT CAPACITY SCALE
500 to 5000 Lbs. Tare Beam 100 to 500 Lbs. for
Railroad and Commercial Use

NATIONAL FIXTURES

Distinctive Show Cases, Bank, Store, Drug and Office Fixtures--Advanced Models

Are high grade and pleasing in every respect. They have an air of elegance and distinction which appeals to men of fine taste in business. **USERS** of **NATIONAL** fixtures are **NATIONAL BOOSTERS**. There **MUST** be a reason--there are **MANY**.

NATIONAL fixtures are designed by experts, handled by skilled mechanics and artisans, in every detail and process of manufacture, finish and erection. **NATIONAL** fixtures are built in thoroughly modern, up-to-date plants, equipped with the highest grade of machinery known to the business. Therefore, "**WE BUILD TO ENDURE**" is not an adopted term, but a natural truth growing out of skilled manufacturing.

Keeping pace with modern development and progress and the demands of the general public for high grade, up-to-date fixtures, each year we make additional improvements, such as are necessary to enable us to improve our product and meet this growing demand.

We are just completing four handsome illustrated catalogues, exhibiting advanced 1912 models of **distinctive Show Cases, Bank, Store, Drug, Jewelry and Office Fixtures**. The **NATIONAL** does not confine its building to these numbers and models, but are prepared to submit special designs, incorporating the ideas of our customers, suited to the needs of any business whatever.

If interested in buying fixtures (and every merchant should be), we would be glad to send you one of these catalogues, or, if you prefer, have our practical salesman and designer visit you and assist in arranging bank, store or office. This service we offer without cost to you.

Our business for 1911 has been the largest in our history, and, in every respect, the most satisfactory. We show a net increase over 1910 of 30 per cent. We show a net increase over 1909 of 68 per cent.

Write or wire us **TO-DAY**.



The accompanying group shows those who have built for the **NATIONAL** the enviable reputation of being the foremost fixture manufacturing company in the South.

Our hearts have been in this work and we have labored together with an earnest endeavor to please our customers and supply them with the **HIGHEST GRADE** of fixtures, for the least possible cost. We have watched every order, in each process of manufacture, and have succeeded in pleasing those with whom we have done business. We pay **SPOT CASH** for every dollar's worth of material that enters into the make-up of our fixtures. Our knowledge of materials, our ability to pay cash, our splendid management and able corps of efficient artisans, both in sales departments and every manufacturing department, enable us to sell a **HIGH GRADE** product at the **LOWEST** possible prices.

The mere fact that we please 99 per cent. of our customers ought to be sufficient inducement for the prospective buyer to place his order with the **NATIONAL**. One of our customers last season was so well pleased with his fixtures and our treatment that he interested himself in our behalf, and made it possible for us to secure orders for three handsome outfits through his recommendation. He writes us now regarding three other prospects, "I will wire you in a few days when to send salesman to book the orders." We appreciate this as the highest compliment for **NATIONAL FIXTURES** and the **NATIONAL'S** dealings.

Bankers, Jewelers, Druggists, Merchants, Professional men, everybody are buying **NATIONAL FIXTURES**. **WHY NOT YOU?**

Write or wire us **TO-DAY**.



1. W. W. RAINEY, Sales Manager and Expert Designer.
2. J. H. DIMON, Sec.-Treasurer and Business Manager.
3. W. C. DOLCATER, General Superintendent and Construction Specialist.
4. L. C. JONES, Draftsman and Artist.
5. J. W. HINTON, Detail Foreman and Architect.
6. C. W. RAINEY, Asst. Secretary and Expert Office Man.
7. C. W. TRUSSELL, Mill Foreman and Expert Hardwood Specialist.
8. G. G. TOUNSLEY, Shipping Clerk and Inspector.
9. J. W. HUGHES, Expert Finisher and Wood Craftsman.
10. O. T. WOOD, Expert Mechanic and Erecting Foreman.
11. JAMES A. LEWIS, President, and Capitalist.

NATIONAL SHOW CASE CO.

COLUMBUS, GEORGIA

"THE SOUTH'S LARGEST FIXTURE FACTORY"



"Many laps ahead of other manufacturers"



"Many laps ahead of other manufacturers"

FOR many years architects and builders were compelled to go North to get high-grade face brick in various colors, as there was no factory in the South for the making of such goods.

¶ The Sibley-Menge Brick & Coal Company was organized to fill this long-felt want. Their aim has been constantly to produce the highest grade of face brick, not counting the cost, but at the same time selling their product at the lowest prices consistent with safety and reason. They have been serving the building public of the South for more than five years, and as a result the price of press brick has been reduced to the purchaser several dollars per thousand, saving in aggregate to the property owner many thousands of dollars.

¶ How well their efforts have been appreciated is shown by the large number of buildings of every character that have been faced with their bricks, and these buildings constitute their best advertisement. Anyone in the market for their wares will please write the home office, and samples and prices will be furnished; or the nearest agent can be communicated with.

Capacity in 1906,	20,000	per day
“ “ 1908,	40,000	“ “
“ “ 1911,	100,000	“ “

Sibley-Menge Brick & Coal Company

Home Office, Brown-Marx Building
BIRMINGHAM, ALABAMA

Agencies in all leading cities of the South Atlantic and Gulf States

SPECIFICATION
Armitage Slag Roofing
 1.—One thickness of Sheathing Paper to be laid with edges overlapping 1 to 2 inches.
 2.—Two piles of Old Dominion brand felt, lapping each sheet 16 inches over preceding carefully nailed and thoroughly mopped with Armitage Roof Pitch.
 3.—Lay 3 piles of Old Dominion brand Tarrad Felt, lapping each sheet 21 inches over preceding one and coating entire surface with Armitage Roof Pitch, nailed where necessary so that all nails will be covered by it at least 2 piles of the felt.
 4.—Cover the entire surface with a uniform coating of Armitage Roof Pitch, imbedding while hot 300 pounds of best quality slag to each 100 sq. ft. This slag shall be free from dust or dirt and be from 3/4 to 5/8 in. in size.
NOTE
 Sheathing paper to weigh not less than 6 pounds to 100 sq. ft. Old Dominion brand Felt to weigh not less than 14 pounds to 100 sq. ft.

The Best Roof Under the Sun--or Storm, Either for factories and buildings of every description requiring durability and low cost is

Armitage Slag Roofing!

ARMITAGE SLAG ROOFING is composed of alternate layers of felt, cement and best quality slag, and will give better satisfaction at less expense than roofs of tin, copper, slate, etc.

ARMITAGE SLAG ROOFING IS FIREPROOF—NEEDS NO REPAIRS, AND IS GUARANTEED FOR TEN YEARS. There is practically no maintenance expense, and many instances might be cited where ARMITAGE SLAG ROOFS have given double the guaranteed service.

For durability, satisfaction and low cost, insist on ARMITAGE SLAG ROOFING, or better still, let us quote an estimate on your requirements.

Write today.

The Armitage Mfg. Co., - Richmond, Virginia

SPECIAL NOTICE

"IVORY" Cement Plaster	"ATLAS" White Portland Cement	Terra-Cotta Flue Pipe and Chimney Linings
"IVORY" Wood Fibre Plaster	Pine and Cypress Shingles	SASH
Finish Plasters	"SOUTHERN CROSS" ROOFING	BLINDS
Plaster of Paris	"SEA GRASS" Deadening Quilt	Sash Weights
"SACKETT" Plaster Board	"OLD NORTH STATE" Sheathing Paper	Sash Cord
Pine and Cypress Laths	Salt Glazed Facing Brick	Putty
Metal Laths	Pressed Facing Brick	Window Glass
"OLD NORTH STATE" Painted and Galvanized Tin Shingles and Trimmings	Mortar Colors	Florentine Glass
"WHITE ROCK" No. 1 V. A. Lime	Wall Ties	Ribbed Glass
Hydrated Lime	Fire Brick	Plate Glass
Sanitary Lime	Fire Clay	SHINGLE STAINS
Ground Limestone	Architectural Terra-Cotta	No. 1 Diamond Glazier's Points
Standard Brands of Portland Cements	Vitrified Terra-Cotta Pipe and Fittings	No. 1 Diamond Glazier's Point Drivers

WHEN IN THE MARKET FOR ANYTHING SPECIFIED ABOVE—ASK—

B. F. WITHERS
 DISTRIBUTOR
BUILDERS' SUPPLIES
 CHARLOTTE, N. C.

Impervious "Cravenette" Face Brick

The Largest Line, and Greatest Variety of Shades Manufactured
 in the United States. Prices Cannot be Equaled

STANDARD BRICK COMPANY

South's Greatest Brick Company

W. E. DUNWODY, Pres.

We Make and Sell Building, Face, Fire and Paving Brick

MACON, GEORGIA



Residence DR. W. A. RICHARDS, Calhoun, Ga.

JOHN C. BATTLE, Architect

Built of Legg Brick Company's Red Pressed Brick.

Brick manufactured from the purest of Shale, burned with Gas.

RESULTS:

The Finest Face Brick in the South.

LEGG BRICK COMPANY
 Manufacturers
 CALHOUN, GA.

B. Mifflin Hood Brick Co.

General Offices, ATLANTA
 Branch, . . . MEMPHIS

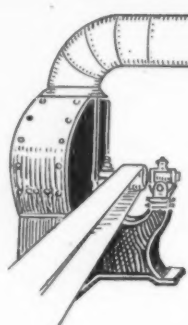
Our Shale Brick Plants are located in Alabama and Georgia

The following are a few of our 1911 contracts:

Building	Location	Architects
Loyola College,	New Orleans,	DuBuis, Churchill & Labouisse.
Sterling Meyer Residence,	Houston,	Sanguinet & Statts.
County Jail,	San Antonio	H. T. Phelps
Normal School,	Binghampton, Tenn.,	Alsop & Smith.
Y. M. C. A.,	Birmingham,	H. B. Wheelock.
Y. W. C. A.,	Birmingham,	D. O. Whilden.
High School,	Helena, Ark.,	Mathews & Fry.
Agnes Scott College,	Decatur, Ga.,	Morgan & Dillon.
Four Public Schools,	Atlanta,	E. E. Dougherty.
Grady Hospital,	Atlanta,	King & Walker.
Mayor Robt. F. Maddox, Res.,	Atlanta,	W. T. Downing.
Dinkler Hotel,	Macon,	Curran R. Ellis.
Georgia Life Bldg.,	Macon,	Hentz & Reid.
W. M. Keith Residence,	Memphis,	Jones & Furbinger.
Hardy Residence,	Augusta,	H. T. Wendall.
Southerland Apartments,	Columbia, S. C.,	J. B. Urquhart.
A. J. Ives Residence,	Savannah,	Wallin & Young.
Dr. LeEngle Residence,	Jacksonville, Fla.,	J. R. Walsh.
Brent Residence,	Pensacola,	W. D. Willis.
George Adair, Clyde King and	DeGive Residence, Atlanta.	

B. Mifflin Hood Brick Co.

Low Speed
Low Power
Systems
a specialty

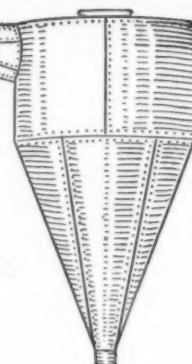


General Sheet Iron Work

All Work Guaranteed

Let us hear from you when in need of anything in our line, and we will have our representative call to submit plan and price

Heating
and
Ventilating
Systems



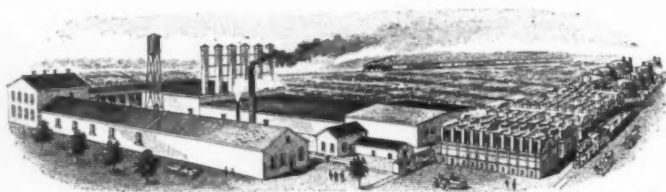
South Atlantic Blow Pipe & Sheet Metal Co.

Atlanta, Ga.

SAVANNAH, GA.

Jacksonville, Fla.

Soubriterra Products



Rough Texture Face Brick
Fire Brick

Common Building Brick

Each the best of its kind

On account of our large capacity we
can take care of all contracts promptly

Southern Brick & Terra
Cotta Co.

COLUMBUS, GA.

Largest Manufacturers of Brick in the South

Massee & Felton Lumber Co.

MACON, GA.

Manufacturers of

Hardwood Lumber

Doors, Sash, Blinds

AND

GENERAL MILLWORK

Specializing on

VENEERED DOORS

AND

HARDWOOD TRIM

Our GUM VENEERED DOORS are
very handsome, finished natural or
stained mahogany or walnut, with
trim to match.

ESTIMATES FURNISHED PROMPTLY

Address MACON, GA.

Yellow
Pine

"The Kaul Kind"

Yellow
Pine

KAUL
LUMBER
CO.

BIRMINGHAM, ALA.

Yard Stock
Shed Stock

Paving Block Stock

Timbers
Lath and Shingles

THE MATHIESON ALKALI WORKS

SALTVILLE, VA.

Organized in 1892

Capitalization, \$10,000,000

Property owned 12,000 acres

Coal consumption annually, 125,000 tons.

Second largest freight producer on Norfolk & Western Railway.

Valuable limestone quarries, products of which are transported over aerial tramway.

Inexhaustible salt deposits, formerly source of supply for Confederacy.

Twenty years of continuous operation and constant growth.

PRODUCTS

SODA ASH

CAUSTIC SODA

BICARBONATE SODA

SAL SODA

SESQUICARBONATE

SALTVILLE SODA

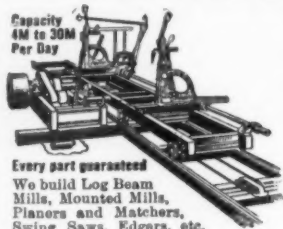
CRYSTAL CARBONATE

GROUND CAUSTIC

Here's the HUSTLER Saw Mill

You've Heard So Much About

Built especially to saw lumber better and quicker than any other mill, and to last longer. The many time and labor saving improvements make it the lightest running, fastest cutting little mill you ever saw—easy to handle, durable and satisfactory. Has the famous Heacock-King variable belt feed works, the best



Capacity
4M to 30M
Per Day

Every part guaranteed
We build Log Beam
Mills, Mounted Mills,
Planers and Matchers,
Swing Saws, Edgers, etc.

ever invented, steel head blocks, bottom and top dogs, automatic offset of the log when giggered back, spring receder, steel lined carriage, taper knees, wire cable drive—in fact, every improvement that will add to efficiency, quality and durability.

Write today for Catalogue No. 32

SALEM IRON WORKS

Winston-Salem, N. C.

WARSAW ELEVATOR COMPANY

Main Office and Works, WARSAW, N. Y.

T. FRANK WILHELM, Manager, BALTIMORE, MD.



Branches in New York, Rochester, Buffalo, Philadelphia.

We are making rapid strides in the South, and the high quality of our equipments are rapidly gaining favor with the public.

We have recently equipped three large Apartment Houses in Baltimore (Tudor Hall, Homewood, and The Latrobe) with Elevators and Dumb Waiters.

Through the Baltimore Office we will shortly begin the erection of three high-speed passenger elevators in the new 13-story office building for the Commercial National Bank at Charlotte, N. C.

Estimates cheerfully furnished on equipments of every character.

Ruse & Thompson

9-11 N. GAY STREET
BALTIMORE, - MD.

Manufacturers and Designers of

Store and Bank Fixtures
Office Partitions and Rail-
ings, Show Cases, Office
Desks, Tables and Chairs
Filing Cabinets and Sec-
tional Bookcases

Designs and Estimates
Cheerfully Furnished

CRINNELL AUTOMATIC SPRINKLERS



ASK YOUR FIRE INSUR- ANCE AGENT

how much premium reduc-
tion you can get by installing
automatic sprinklers.

THEN ASK US

how much it would cost to
install a complete equipment
in your premises.

YOUR PENCIL

will soon tell you how long it
would take for the decrease
in premiums to pay for the
installation.

CRINNELL AUTOMATIC SPRINKLERS

have put out so many incipient fires
as to well merit the appellation
"Standard of the World." They
have been leaders in the reduction
of insurance cost through actual
preventive measures. They abso-
lutely prevent large fires by extin-
guishing small ones.

SEND US YOUR REQUIREMENTS

We will make the complete layout,
and furnish and install the entire
system without delay. We maintain
plants, warehouses and offices in all
parts of the United States and Canada.

GENERAL FIRE EXTINGUISHER CO.

EXECUTIVE OFFICES: PROVIDENCE, R. I.
SOUTHERN DEPARTMENT: ATLANTA, GA.

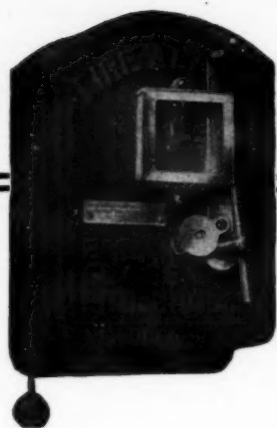
The Automatic Sprinkler Bulletin

published periodically, will interest you. It is full of
information on sprinkler protection and may be had for
the asking.



40-17

CRINNELL AUTOMATIC SPRINKLERS



SOUTHERN TOWNS

Our Fire Alarm System

is not expensive, and you will be more
secure with one

THERE are many Southern towns alive to the great benefit of a local fire alarm system and which need one, but think it would cost too much. This is not the case; our system can be installed and maintained at an exceedingly moderate price, and besides the people of your town will be able to get more favorable insurance rates. Furthermore, they will have a

greater feeling of security than under old-time conditions.

In our forty years' experience we have pretty well mastered the field of fire alarm signals—learned the ins and outs, learned

**Victor Talking-Machine
Company**



CAMPDEN, N. J., U.S.A. 1/22/12

Baltimore Machine & Products Co
Baltimore, Md.

Gentlemen:

Gentlemen; We received from you one fire-alarm box #15. We have put this through a most severe and rigid test, in other words, we have pulled this box 342 times. This makes 1210 rounds or 7260 strokes and after this exhaustive test we find the box in perfect working order.

This test was made in the presence of the writer and we are perfectly satisfied that a better box could not be installed in our system.

We also desire to thank you very kindly for your attention in this matter.

Truly yours,

VICTOR TALKING MACHINE COMPANY

H. W. Troth
Gen'l Superintendent
of Maintenance

how to construct a thoroughly reliable and easily maintained system—and when you are ready to consider that system you have been thinking about so long, we want to confer with you.

We have larger space devoted to fire alarm work than any other plant in the world, and as our selling expenses are much less than other manufacturers', our system not only costs less

than others, but is very reasonable in price.

We want to hear from you. We will gladly give you the names of users so you can investigate for yourselves, and also go into other details.

The Baltimore Machine Products Co.

RELAY STATION P. O.

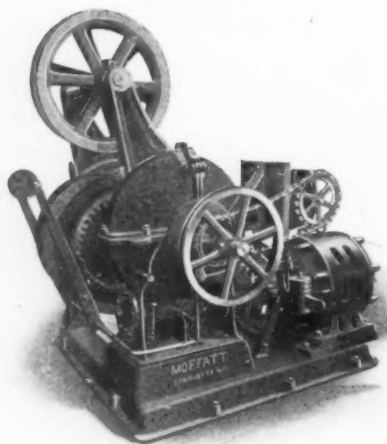
BALTIMORE, MD.

GOOD ELEVATORS—BOTH PASSENGER AND FREIGHT

MANUFACTURED BY

Moffatt Machinery Manufacturing Company

CHARLOTTE, N. C.

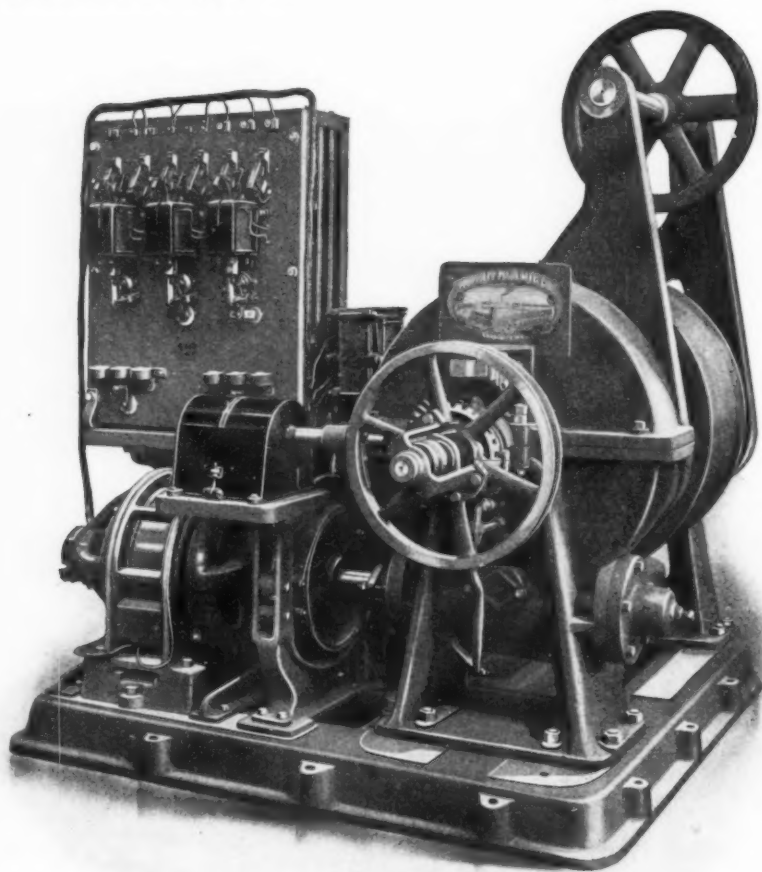


Compound Freight

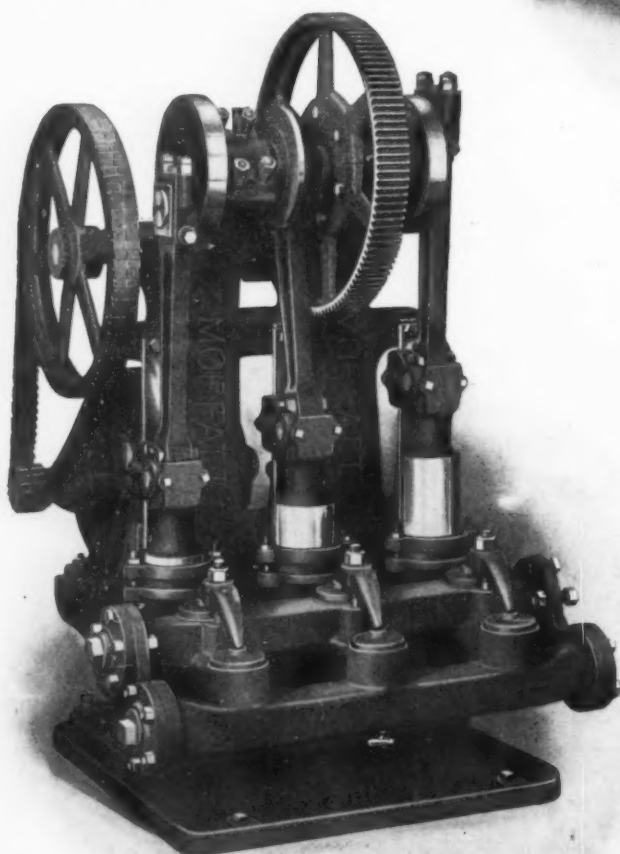
Our elevators are of new, up-to-date designs, having all improved features that go to make the best both as to Safety, Simplicity and Long Life.

With twenty-five years' experience and close attention in improving and building elevators, we can honestly say we make good elevators. The best is not too good.

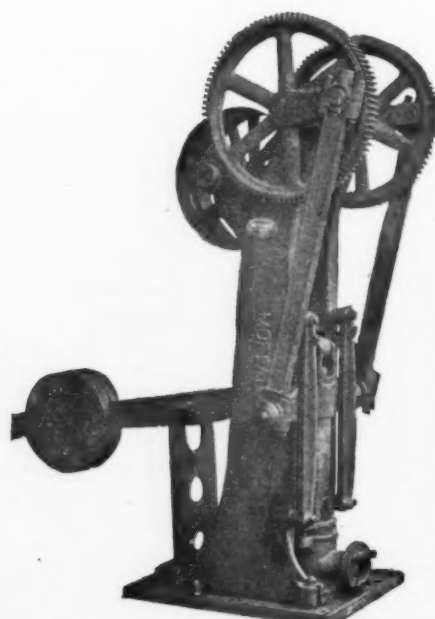
Elevators for all kinds of service—Direct Connected Electric Passenger and Freight Elevators—Direct Connected Electric Compound, geared for heavy freight work—Electric Four Cable Automobile Elevators—Hydraulic Elevators operated by both city and pump pressure—Hydraulic Sidewalk and Ash Lifts—Elevators Belt Driven for all kinds of service—Hand Power Elevators and Sidewalk Lifts—Dumb Waiters, both electric and hand—Automatic Elevator Doors and Gates.



Heavy No. 3 Passenger with any kind of control wanted



Triplex Power Pump—any kind of drive wanted
Simple, strong and most convenient.



Deep Well Pump with Equalizer

Pumps that have been thoroughly tested:

Deep Well Pump—equipped with adjustable counter balance and double gear drive. All pumps furnished with either motor or belt drive.

This is Interior Protection—the Kind that Safeguards Life and Contents

Tenant, owner, builder and architect should first know what constitutes absolute fireproof protection rather than to learn afterwards that their confidence had been misplaced; that, however perfect and fireproof the exterior walls, they only form a flue for the destruction of the inflammable interior and contents of the building.

WHEN you have eliminated all inflammable materials in a building by replacing wood with steel in every part of its interior, then, and then only have you a fireproof building in reality.

Without the slightest sacrifice of artistic value, with higher first cost more than compensated for by reduced cost of insurance and maintenance, hundreds of representative buildings have been fireproofed in the highest sense of the term by

DAHLSTROM Metallic Doors and Trim

Absolute fireproofing simply means that wherever wood has heretofore been used it is replaced with the Dahlstrom Steel Products. If the exterior walls, floors and partitions are of fireproof construction and the last link in the chain, the Dahlstrom Metal Doors, are added, every room is converted into a fireproof unit—artistic, sanitary, immune from flames for all time.

Everyone who values human life should draw the line of distinction between so-called "fireproof" buildings and those *fireproof in fact*.

"Buildings As They Should Be"

—a book illustrating the exteriors and interiors of a few of the world's most prominent structures equipped with The Dahlstrom Products thoroughly describes "life and contents" fireproofing.

*To the interested a copy
is free for the asking.*

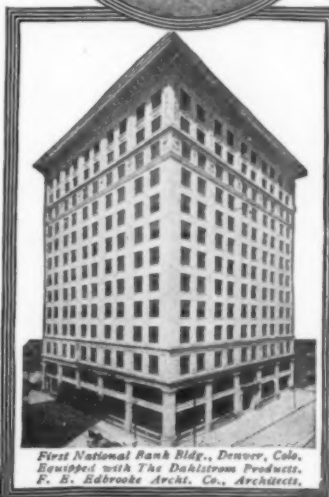


DAHLSTROM METALLIC DOOR CO.

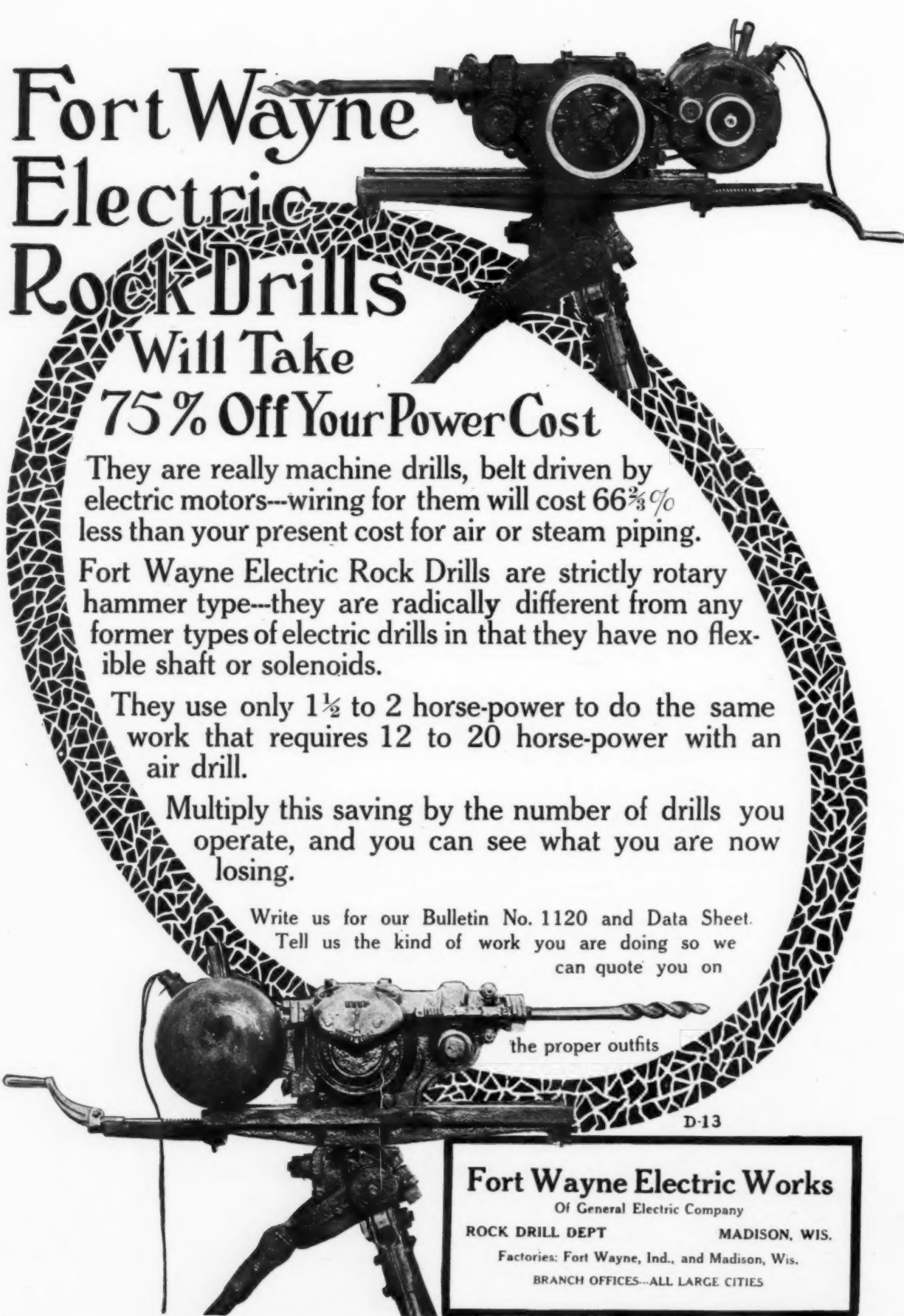
Executive Offices and Factories:

73 Blackstone Avenue, Jamestown, N. Y.

Branch Offices in All Principal Cities



*First National Bank Bldg., Denver, Colo.
Equipped with The Dahlstrom Products.
F. B. Edbrooke Archt. Co., Architects.*



Fort Wayne Electric Rock Drills

Will Take 75% Off Your Power Cost

They are really machine drills, belt driven by electric motors--wiring for them will cost 66 $\frac{2}{3}$ % less than your present cost for air or steam piping.

Fort Wayne Electric Rock Drills are strictly rotary hammer type--they are radically different from any former types of electric drills in that they have no flexible shaft or solenoids.

They use only 1 $\frac{1}{2}$ to 2 horse-power to do the same work that requires 12 to 20 horse-power with an air drill.

Multiply this saving by the number of drills you operate, and you can see what you are now losing.

Write us for our Bulletin No. 1120 and Data Sheet.

Tell us the kind of work you are doing so we can quote you on

the proper outfits

D-13

Fort Wayne Electric Works

Of General Electric Company

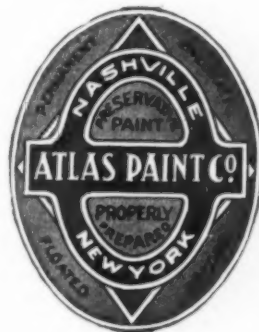
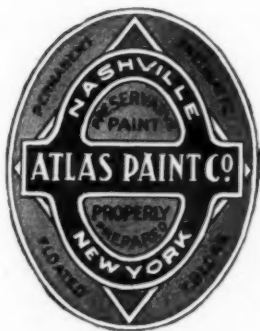
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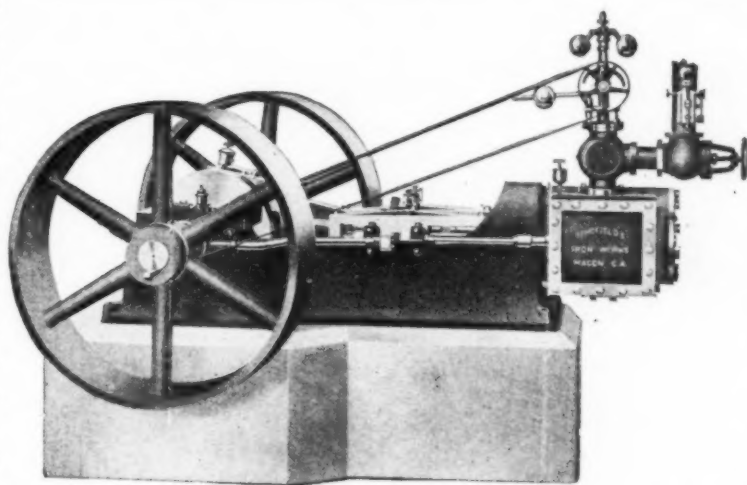
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THROUGHOUT THE SAWMILL BELT are well known The SCHOFIELD Engines and Boilers

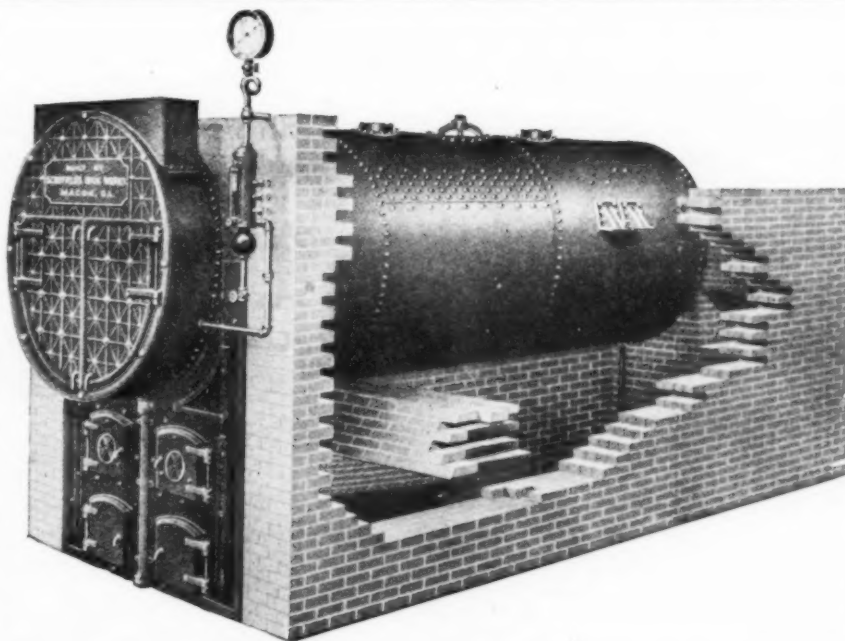
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They are all built in strict accordance with the Hartford specifications and of the very best material, fully tested before leaving the Mills where manufactured, and each and every boiler tested under hydrostatic pressure 50% in advance of the working pressure before leaving the shops of the Company. The Huston Patent Brace is used in the construction of their boilers, made of the same material as the boiler shell, and the Patent Roe Manhead Plate and fixtures, and the



smoke box front is made of heavy cast-iron, as well as the half-arch front or full front, as may be desired. They build these boilers in from 10 to 250 H. P. and in pressures 100 to 200 pounds working pressure, as may be desired by the customer. The cut shown herewith represents one type of their boilers, but they have several other types which they can furnish when so desired. Blueprints and plans are supplied each customer for setting his boilers and engines.

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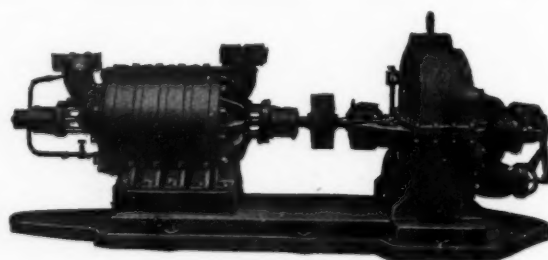
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What The South Thinks Of TERRY TURBINES

¶ Terry turbo-pump sets with a total capacity of nearly half a hundred thousand gallons per minute are in use in the South today.

¶ Terry turbo-blower sets totalling almost a thousand h. p. are operated by Southern gas companies.

¶ Below are a few of the many Southern companies using Terry Steam Turbines—more than 1000 Terrys being in use in all parts of the world—on land and sea.

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Houston Light and Power Co. Washington Gas Light Co.
Consumers Ice Co., Memphis. Tampa Gas Co., Tampa, Fla.
Cons. Coal Co., Fairmont, W. Va. New Orleans Gas Light Co.
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We have eight bulletins on "Terry Service." Write our nearest office today.

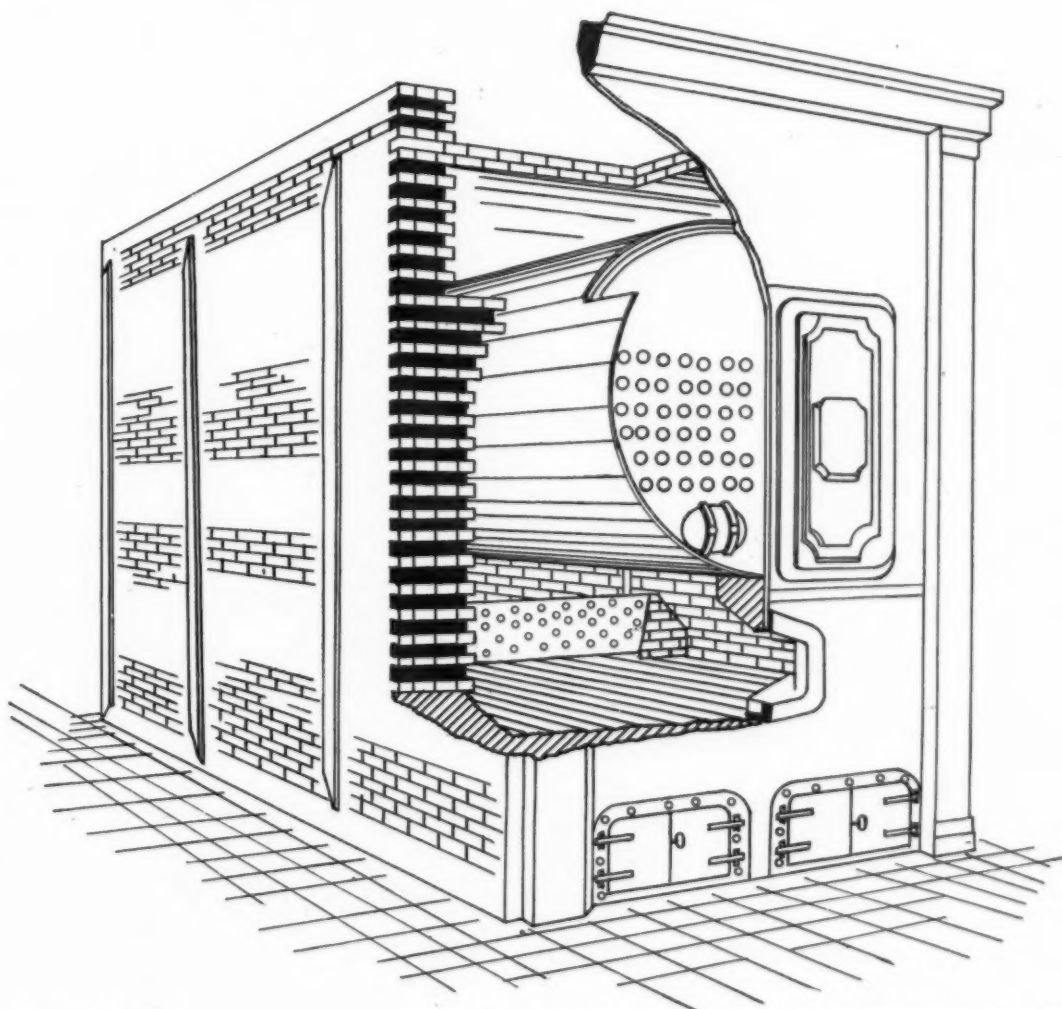
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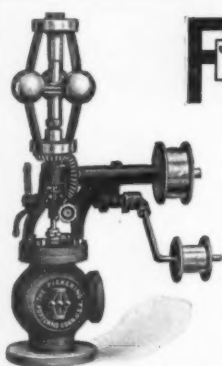
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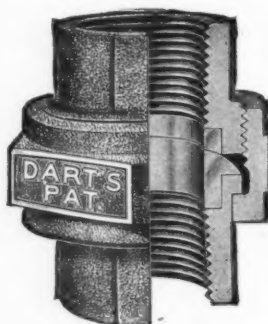
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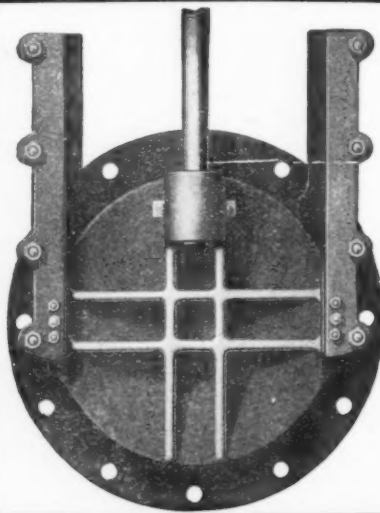
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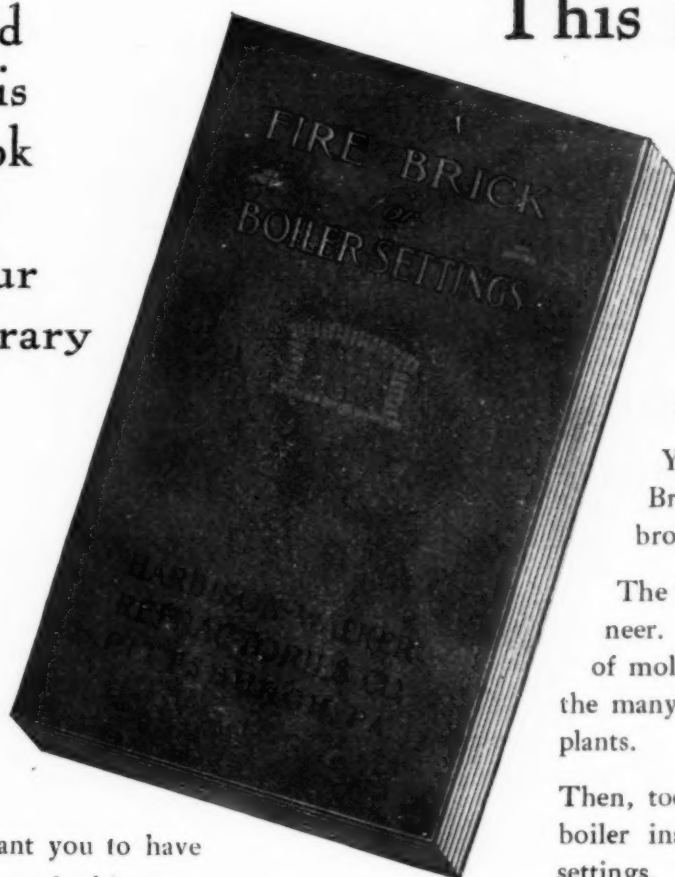
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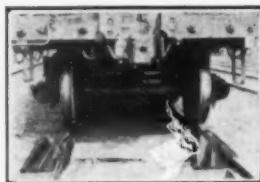
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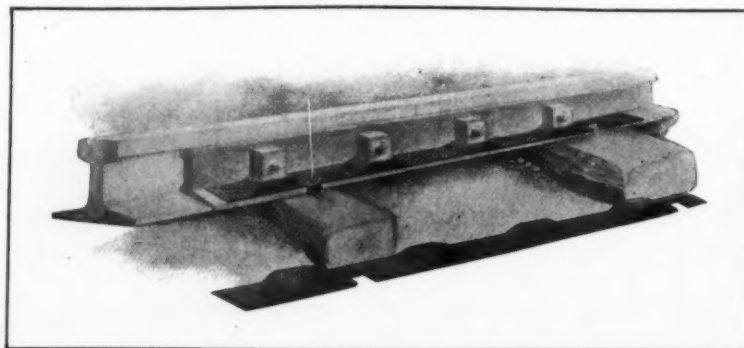
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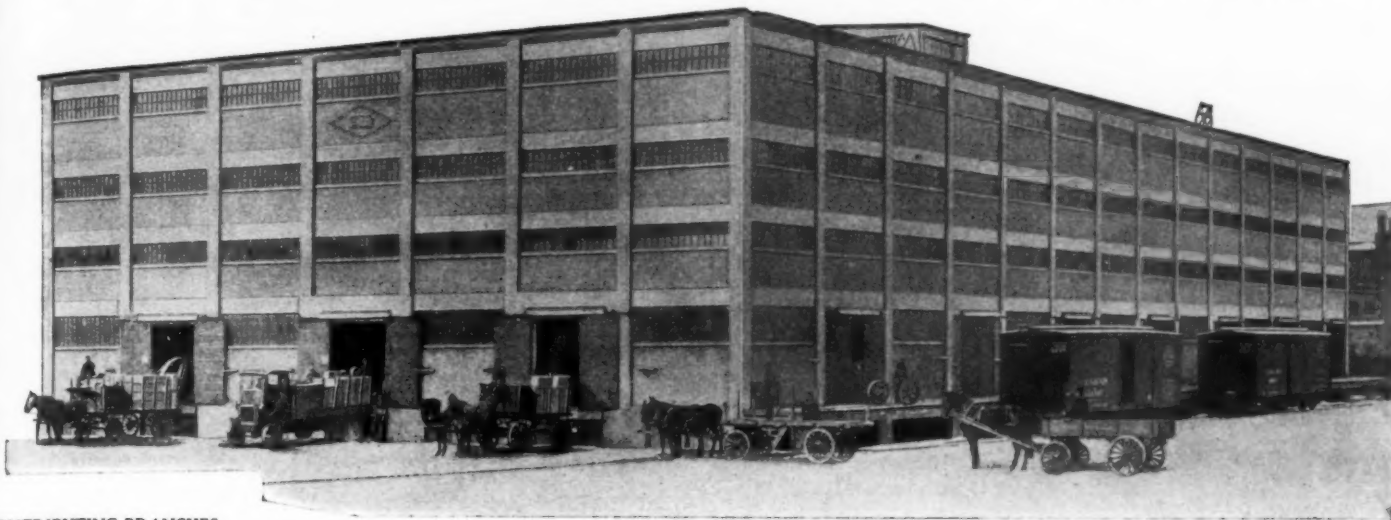
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What does it all mean, Mr. Power User?

It means just one thing, a thing you are vitally interested in—SERVICE.

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Access today, tomorrow—now—to the largest stocks of pulleys, hangers, pillow blocks, bearings, collars, couplings, friction clutches, shafting, etc., in the world—and QUALITY goods at that.

We are, and have been for many years, filling complete transmission orders in double-quick time from our tremendous stocks. It has become so much the usual thing as to be commonplace to us, but perhaps you do not know what DODGE SERVICE can do for you and is doing for hundreds of manufacturers.

A complete factory equipment, consisting of 1200 ft. of shafting, 50 couplings, 200 hangers, all of one size; 50 split iron pulleys and 250 split wood pulleys, was recently shipped from Mishawaka the day the order was received, and we could have duplicated it within the bat of your eye.

A Michigan beet sugar factory had a breakdown and called up Dodge, Mishawaka, one Sunday, getting the president on the phone. DODGE SERVICE gave them self-oiling hangers and 4 7-16 shafting the next day, Monday, and on the second day, Tuesday, four pulleys, two 68x14, one 60x21 and one 48x14.

DODGE SERVICE in this case saved the sugar company thousands of dollars.

On another Sunday, Ball Brothers Glass Manufacturing Co., Muncie, Ind., called on the phone for a pulley 80x15x7" bore to replace one which gave out on a blower. A cast iron type of this size was finished and shipped on Tuesday, two days after, and, again DODGE SERVICE prevented a big loss.

A paper pulley on a motor at one of the Pittsburgh Plate Glass Co. plants laid down, and in response to a phone order DODGE SERVICE gave them an iron pulley, 45x21x16" bore, by express on the third day.

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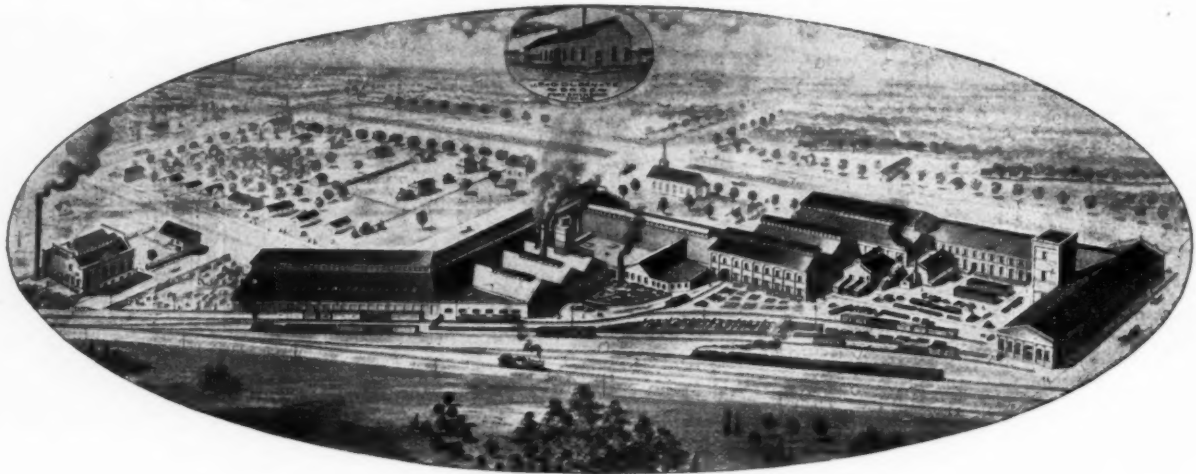
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HERCULES Wire Rope
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Strength — Traction Power — Durability
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COTTON DUCK
BELTING

THE GANDY BELT has this additional distinctive feature, so that you can always recognize it at a glance.

The rest of the belt remains red as before, and continues to bear our brand The Gandy Belt, and our trade-mark A COIL OF BELT AND A BALE OF COTTON LAID ACROSS IT, painted upon the belt at intervals throughout the entire length of the roll.

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REMEMBER The first cost of THE GANDY BELT is only about one-third as much as leather belting, and about two-thirds as much as rubber belting, while it will do the work equally as well.

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Firm name.....
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Finest center stock oak tanned leather. Short lap, well made and guaranteed in every point. It is reasonable in price and efficient to the fullest extent in service. Proves itself a money saver wherever used. Try it out under our "guarantee" proposition. You'll be pleased with it.

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The Unit Road Machine

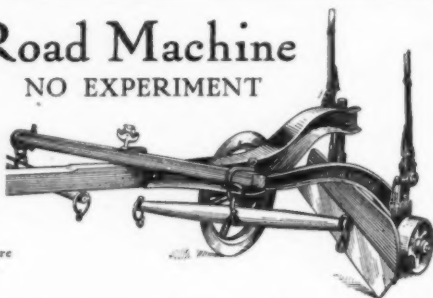
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Used Where the Heavy Machines are Impracticable and does as efficient work.



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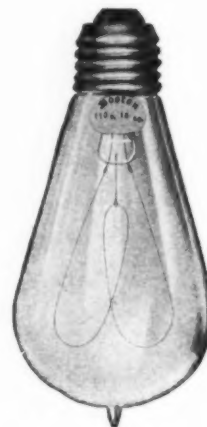
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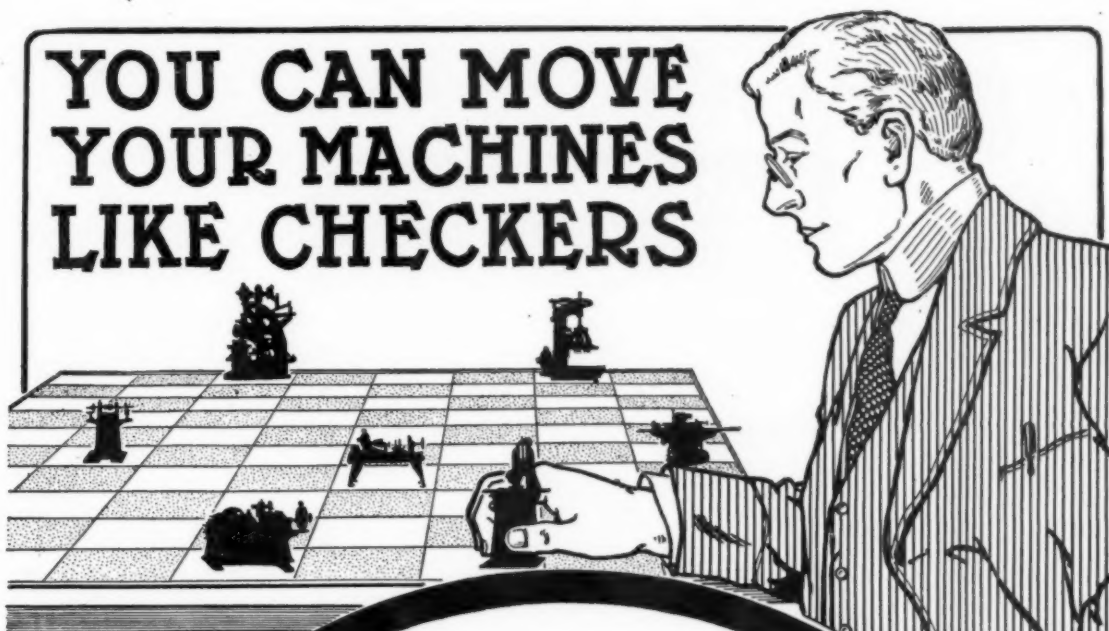


Figure out some time when you see your men hauling material about the factory, how much you could save if you could only locate your machines so that the work would pass direct from one operation to another.

Take the floor plan of your factory—forget all about the present location of line shafts, etc.—and move your machines any place where they will be most convenient. Then imagine the work going through without any lost motion. That's "Scientific Management" you hear so much about, and you can easily have it if you

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Bring the machine to the work and save the big expense of hauling. Operate one machine or a hundred, as you please, and use only the power required to do the work. Eliminate flapping belts, line shafting, idlers and pulleys which waste half the power before it reaches the machine.

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No better motor is built than this
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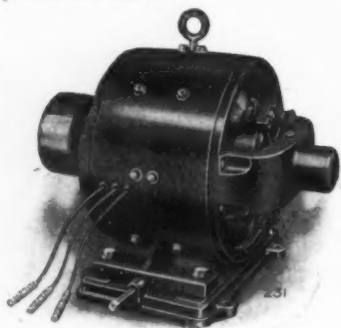
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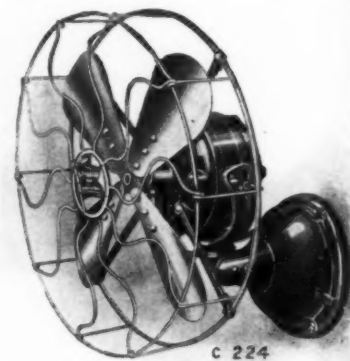
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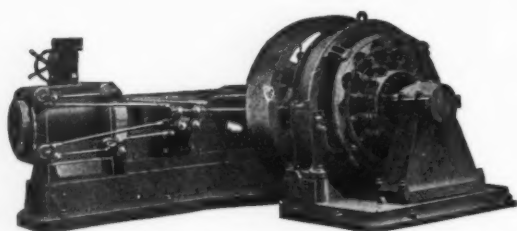
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Good Structural Design and Mechanical Accuracy are, of course, essential, but **Quality**, in the long run, is the true measure of value of every machine, and the key note to a long life of satisfactory service.

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Engines are built in single and four-valve types, either simple, tandem or cross compound as conditions require. Ask for Bulletins Z.

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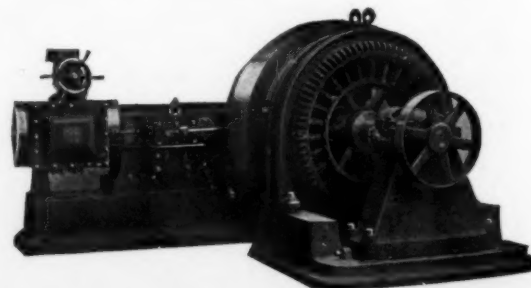
Every important detail of a **Ridgway Unit** is carefully inspected and tested before entering into the machine, thus eliminating any possibility of defective material or faulty workmanship being used. This to us seems very important.

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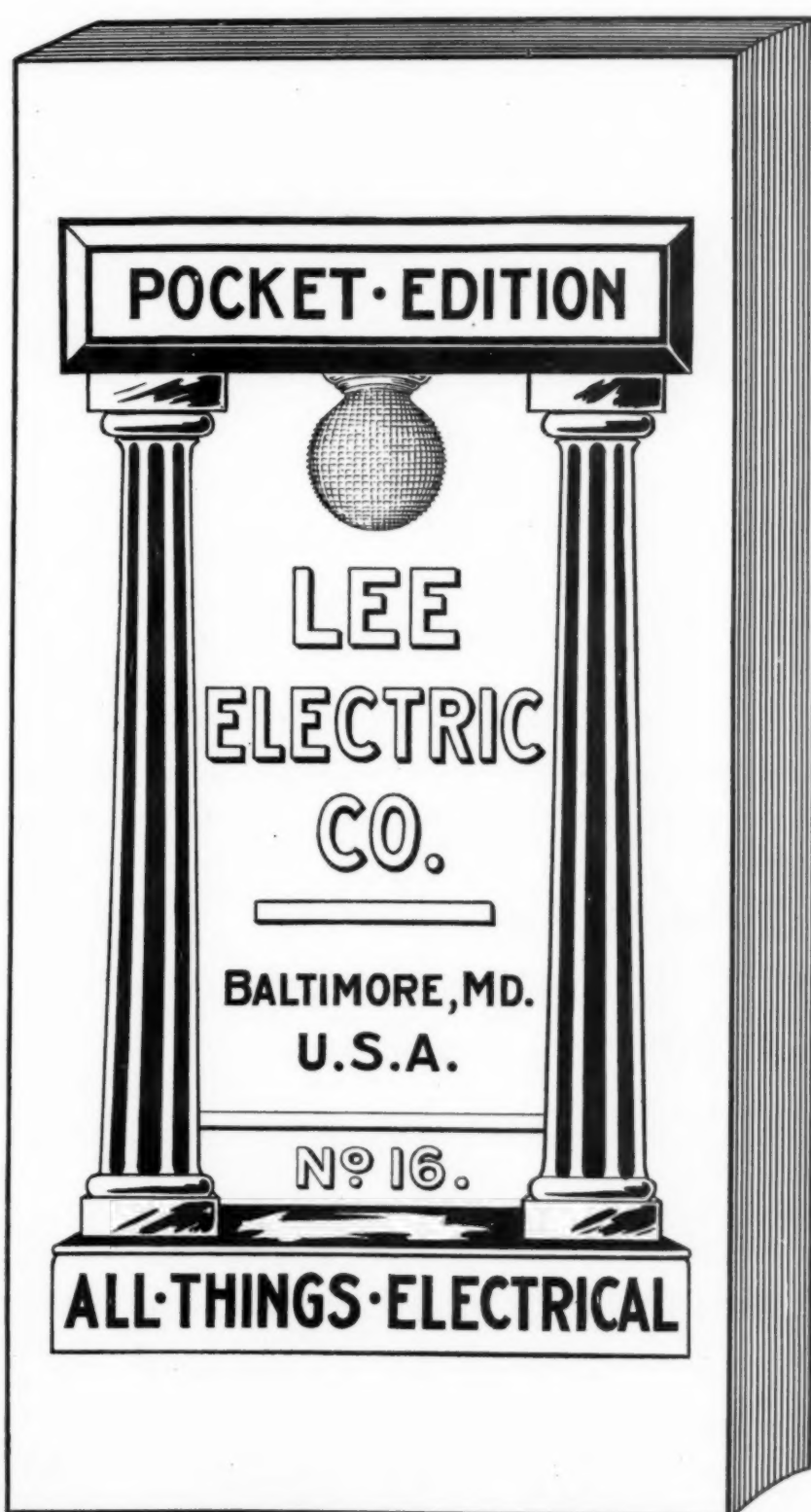
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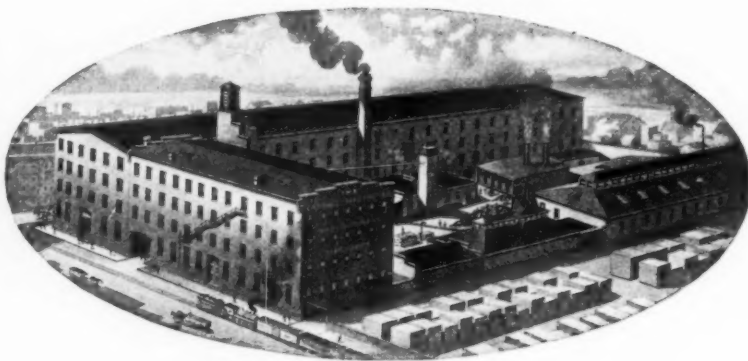
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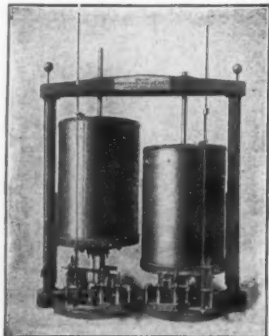
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AND

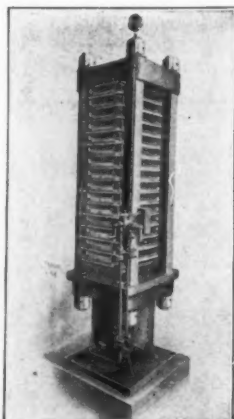
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MACHINERY

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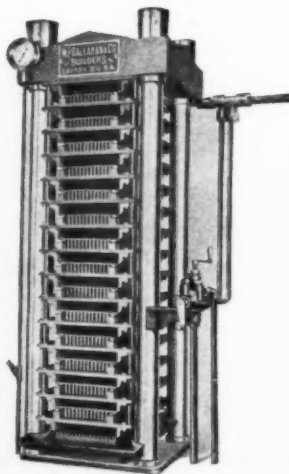
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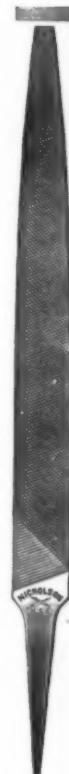
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Made of the best material by
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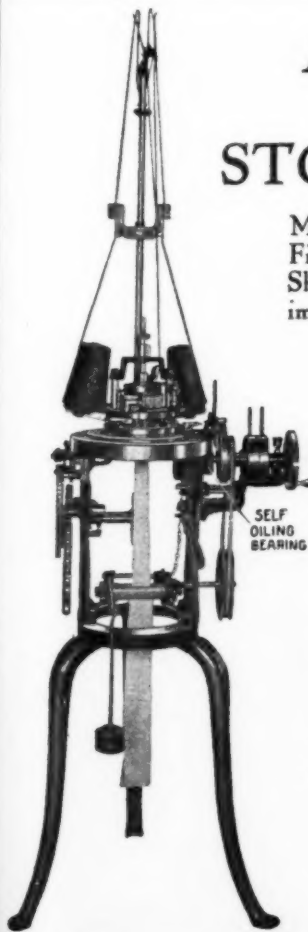
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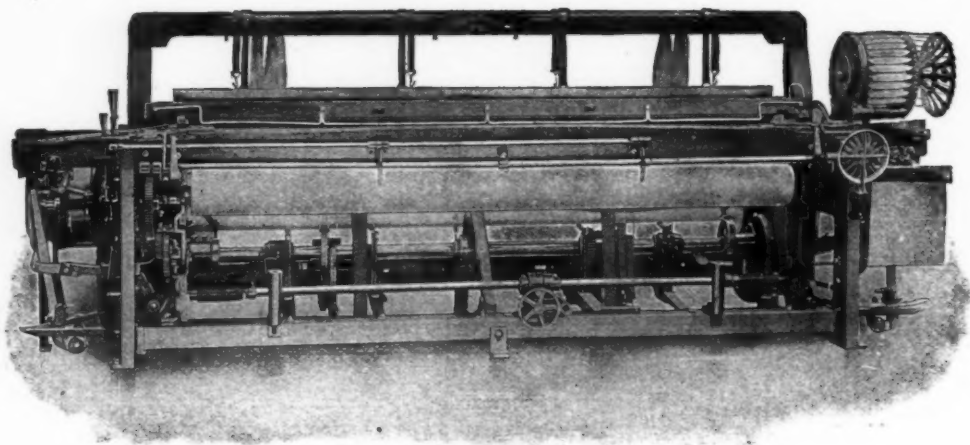
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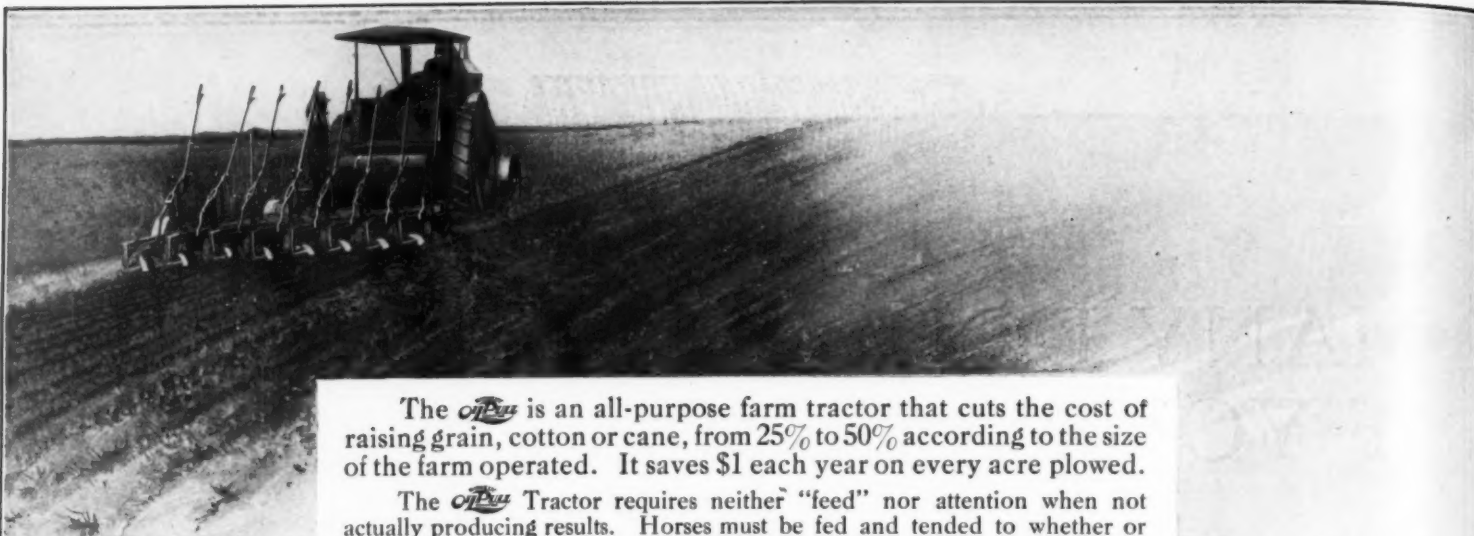
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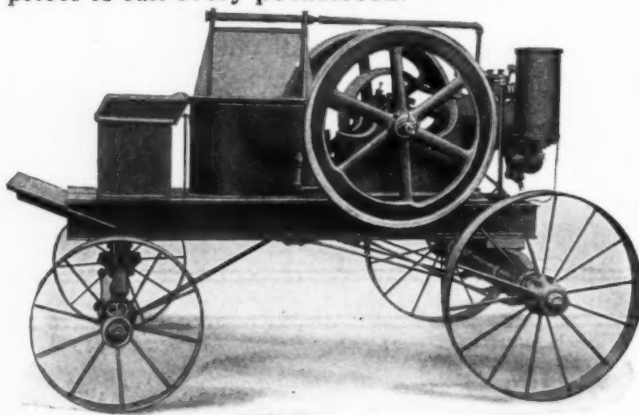
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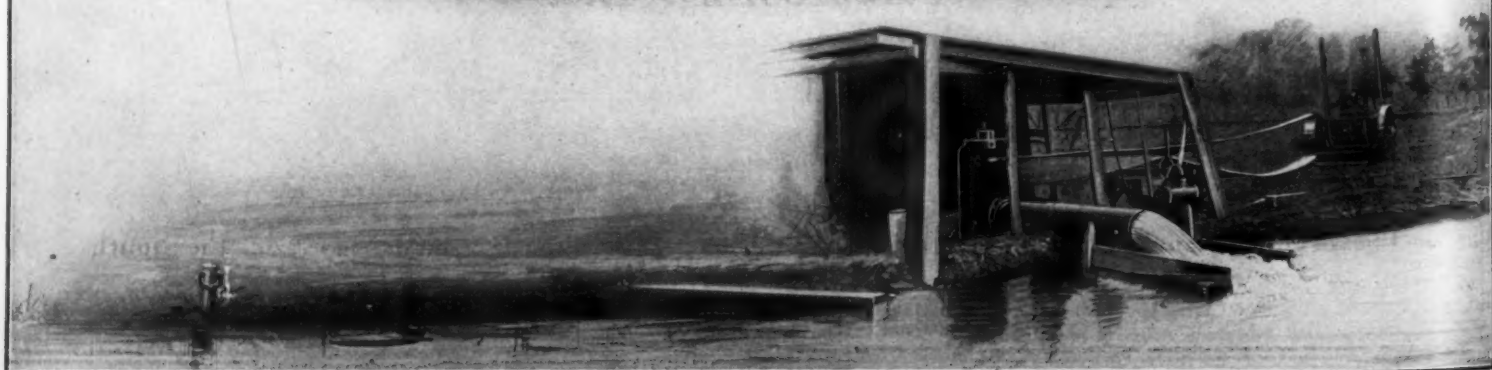
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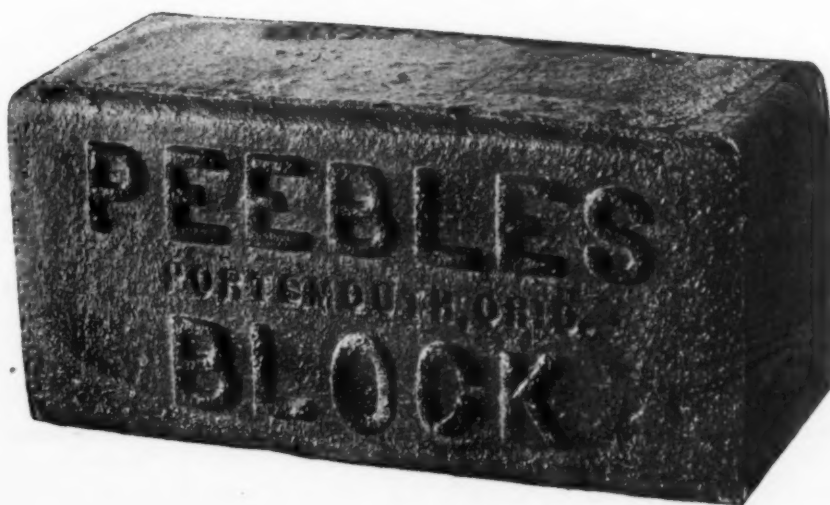


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REFERENCES

Second National Bank, Washington, D. C.
R. G. Dun & Co., Washington, D. C.
National Savings & Trust Co., Washington, D. C.
Smethport Glass Co., Smethport, Pa.
Schrade Cutlery Co., Walden, N. Y.
Clum & Atkinson, Brass Founders, Rochester, N. Y.
Rochester Rotary Pump Co., Rochester, N. Y.
Lawrence Mills, Mrs. Bed Spreads, 51 Brooke Ave., Englewood, N. J.
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M. Winter Lumber Co., Sheboygan, Wis.

C. K. Lassiter, Mechanical Engineer, Schenectady, N. Y.
Pitner Gasoline Lighting Co., Chicago, Ill.
Sprout, Waldron & Co., Mfrs. of the Monarch Feed Governor, Muncy, Pa.
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There would be an air of lonesomeness in the world if all the ammunition banged away in the last century had taken effect.

So much for misdirected energy. Now we come to the point of our story, The Making of a Catalogue.

A poor catalogue is often worse than none at all. Not only does it fail to create a good impression, but it actually makes a bad one—and doesn't get the business!

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HERE'S WHERE WE CAN HELP YOU—

More business won't come through mere wishing—but a Beautiful Catalogue, intelligently handled, will turn the trick.

We everlastingly work for our clients' success, because at the same time we work for our own.

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If you issue a catalogue, or expect to, you are invited to draw upon our ideas to the extent of our ability to serve you. Inquiries are welcomed, and suggestions will be cheerfully submitted.

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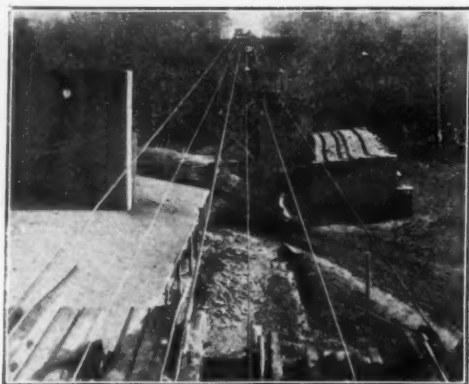
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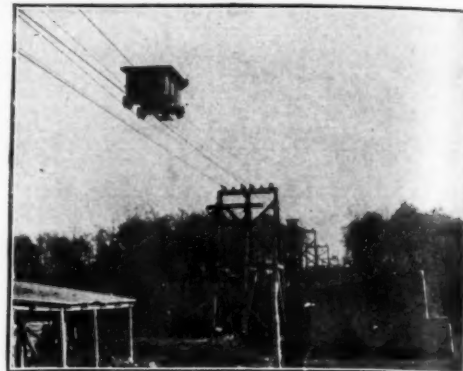
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 Granite, extra well located, for quarrying, and
 good shipping facilities. The best undeveloped
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 secured by first mort-
 gage on productive real
 estate, minimum value of which is eight to ten times
 the face of bonds. Proceeds to be used for further
 improvements. Property situated in one of the
 most resourceful and rapidly developing districts
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Pleased to send you our Catalog

Flavoring Extracts-Spices-Teas

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Absolutely Pure Highest Quality

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Bird's-eye view of Bishop, Tex.; Age 14 months; Population 700.

There Is a Reason for This Phenomenal Growth WHY?

1. **SOIL.** Because Bishop is located in the center of the black-land-belt of the Gulf Coast, surrounded by 500,000 acres of black-waxy hog-wallow land.

2. **PRODUCTS.** Because the soil is particularly adapted to the growing of fruits and vegetables (the year round); one-half to three-quarters of a bale of cotton to the acre is the average yield; alfalfa, corn and other feed-stuffs are raised in prolific quantities.

3. **CLIMATE.** Because the climate is unequalled in any section of the United States—California not excepted. Winter is practically unknown, and fanned by the Gulf breezes during the heated months, the summers are delightfully cool.

4. **WATER.** Because the average annual rainfall is 29 inches, which is well distributed. Surface wells are had at a depth of 40 to 60 feet and a good flow of soft and clear artesian water is found at from 600 to 800 feet. Irrigation is unnecessary.



Bishop Garden Products, taken May 12, 1911



Artesian Well, Bishop, Texas

35,000

acres of this land has been sold during the past year to level-headed farmers from the black-land-belts of North and Central Texas in farms of from 160 to 320 acres; 12,000 acres of this amount has been plowed and will be cultivated in cotton and other crops during the year of 1912.

BISHOP has electric lights, water-works, sewerage, graded streets and roads; three miles of cement walks, telephones, park system and is laid out on broad lines, incidental to the making of a substantial city.

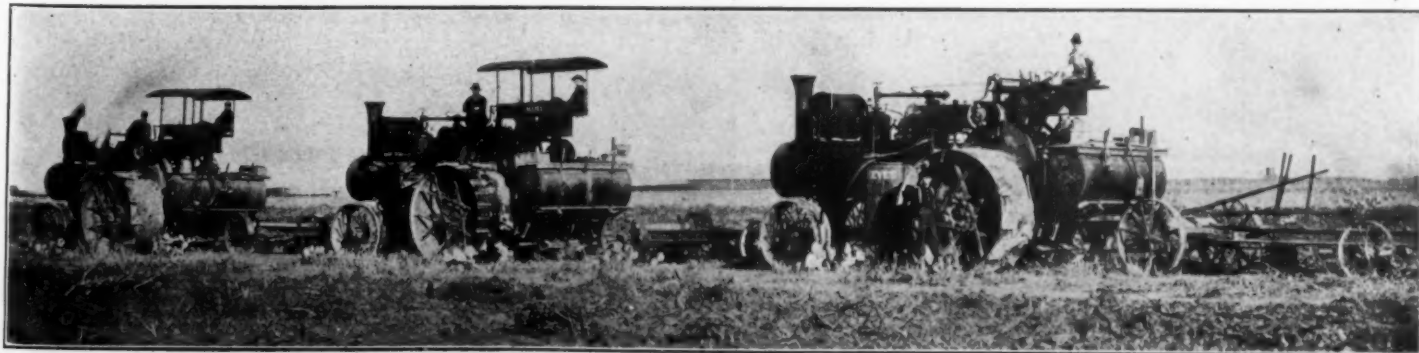
BISHOP will soon be incorporated under a commission form of Government, which will give it a further and better opportunity of carrying out and developing the plans that have been laid for the founding of a metropolitan city on the Gulf Coast.

For further particulars write

Commercial Club

Ben H. Lomax, Secretary

Bishop, Texas



Steam Plows, Bishop, Texas

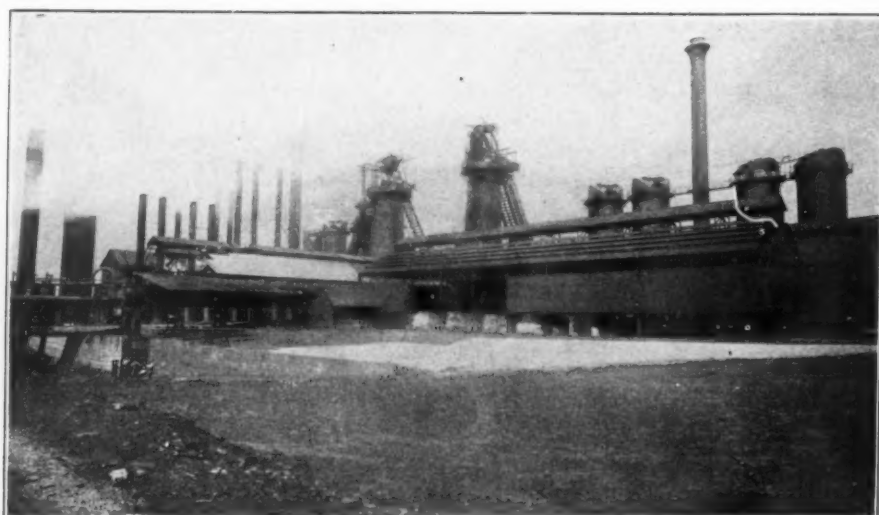
Alabama Consolidated Coal & Iron Co.

Birmingham, Alabama

To be merged with Southern Iron and Steel Co.

[See Opposite Page]

The Combined P



Gadsden Furnaces of Alabama Consolidated Coal & Iron Co.

The Alabama Consolidated Coal & Iron Co. has for years been manufacturing the well-known brands of Clifton and Etowah Pig Iron which are admittedly in the best class of uniform irons.

ETOWAH IRON is sold on Fracture or Analysis grade—Phosphorus under 1 per cent., Manganese .50 and up, Silicon as desired, and Sulphur uniformly low—even in cold grades.

CLIFTON IRON is sold only on Analysis grading—with Phosphorus under .70, Manganese 1 per cent. to 2 per cent., Silicon as desired, low in Sulphur.

Coke Ovens, . . . 1809

Blast Furnaces, . . . 8

Steel Plant . . . 1

Coal Mines, . . . 9

Red Ore Mines, . . . 8

Brown Ore Mines, . . . 4

Limestone Quarries, . . . 4

ACRES

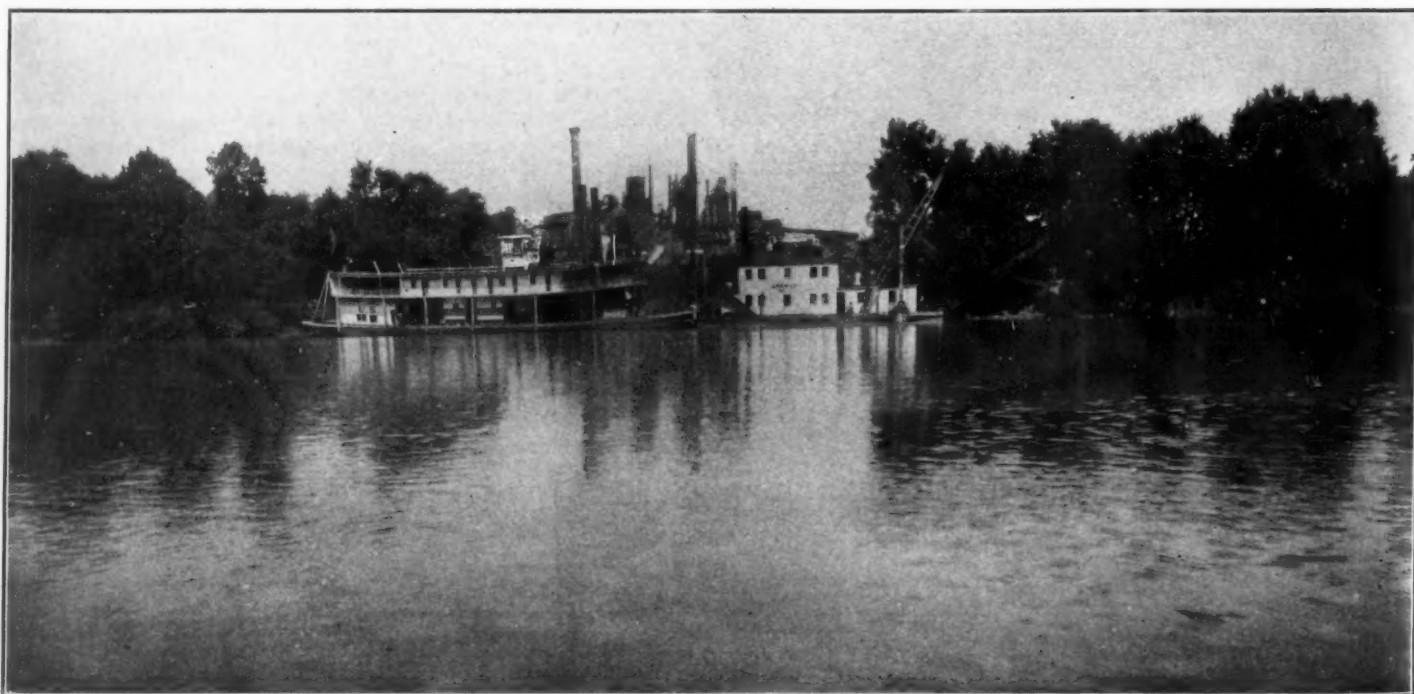
Coal Lands and rights, 78,796

Ore Lands and rights, 61,363

Farm and Timber Lands, 14,577

Plant Sites, . . . 2,090

Total Acres, 156,826



Gadsden Furnaces of Alabama Consolidated Coal & Iron Co., Looking Across Coosa River.

Southern Iron and Steel Company

Birmingham, Alabama

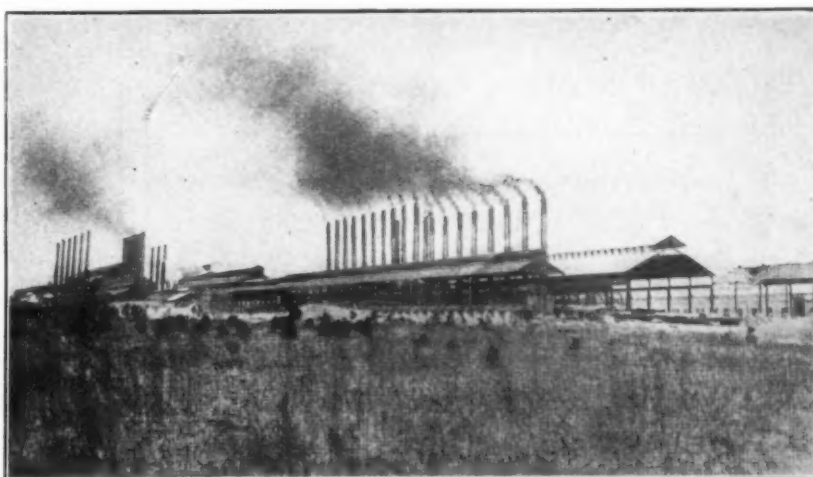
To be merged with Alabama Consolidated Coal & Iron Co.

[See Opposite Page]

Properties

TONS PER ANNUM

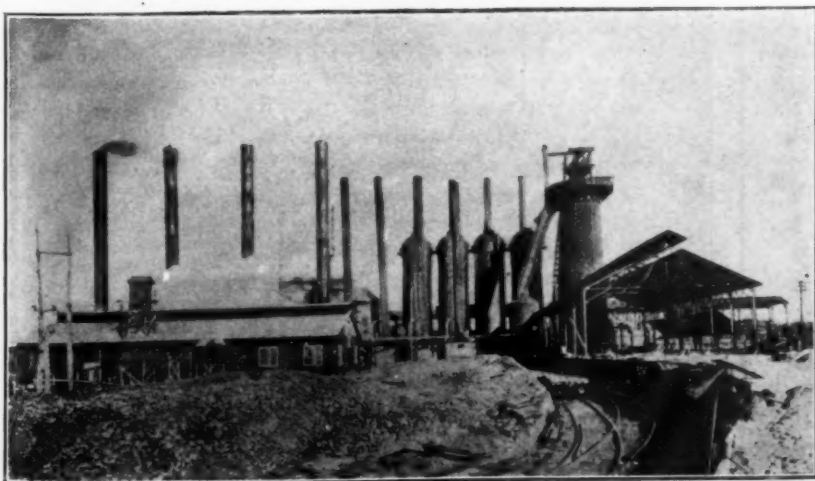
Present Capacity,	780,000
" "	534,000
" "	180,000
" "	2,000,000
" "	960,000
" "	380,000



The Only Wire Mill in the South—Southern Iron and Steel Co.

Producing Ample Supply for All Purposes.
Containing over 1,000,000,000 Tons of Coal.
Containing Over 300,000,000 Tons of Iron Ore.

The Southern Iron and Steel Company's Steel Plant Includes:



Gadsden Furnace of Southern Iron and Steel Co.

STEEL PLANT
with 6 Open Hearth Furnaces
Capacity 500 Tons a Day.

WIRE MILL
which when completed will have a
Capacity of 350 Tons a Day

MERCHANT MILL
producing 80 Tons a Day

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Baltimore, Savannah and Jacksonville

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(Via Newport News and Norfolk)

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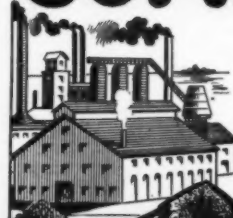
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Through tickets on sale to principal points

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"FINEST COASTWISE TRIPS IN THE WORLD"

COAL AT YOUR DOOR



AT
LOWEST
PRICES

The fuel problem is a vital factor in the success of industries using steam for power. No section of the country enjoys better fuel facilities than the territory tributary to the N. & W. Lines in Virginia and West Virginia.

RAW MATERIAL

Raw material easily accessible is another vital factor in the successful operation of an industry.

In the territory named are large supplies of timber and minerals. Hardwoods, including oak, ash, poplar, hickory and gum, are found widely distributed, while pine and spruce are also abundant. The list of minerals comprises IRON ORE, LIMESTONE, SHALE, MANGANESE, GYPSUM, MARL, GRANITE, CLAYS, and SOAPSTONE.

WATER-POWER

Numerous developed and undeveloped water powers are available as a source of light and power supply, and at this time on the New River in Virginia is being developed more than 100,000 horsepower of hydro-electric energy.

TRANSPORTATION FACILITIES

The Norfolk & Western Railway, with its main-lines both east and west and north and south, offers rapid and efficient transportation and equitable rates. ITS PROGRESSIVE POLICY is assisting in the stimulation of towns and cities along its lines to greater effort and more effective accomplishment. Therefore the commercial opportunities are also attractive, and progressive manufacturers and merchants will find a field that offers many inducements.

Write today for interesting literature and further particulars about industrial, mining and commercial openings.

F. H. La BAUME, Industrial Agent.

Norfolk & Western Railway, Dept. M.

ROANOKE, VA.



CLINCHFIELD COAL



"NEVER SHORT OF CARS"

MINED BY

Clinchfield Coal Corporation
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Clinchfield The Land of Opportunities

Extending from the great coal mining fields of the Cumberland Mountains in Southwest Virginia, across watersheds, down rich valleys, over tablelands, and through vast forest regions to the great cotton belt of the Carolinas, the Clinchfield covers a section of marvelous resources for the creation of wealth.

This newly opened country is rich in agricultural possibilities, great in mineral and timber resources, and offers limitless opportunities for investment and development.

Industrially its timber, coal, limestone, iron ore and building stone, mica, kaolin and other mineral deposits, together with its numerous water-power sites, present a wide range of profitable undertaking to the manufacturer and the investor.

Agriculturally and horticulturally the variety of soils in its valleys, tablelands and mountain sides and its climate are ideally adapted for the growth of all grains, grasses and fruits.

A glimpse into this remarkable country can be had from our booklet, "The Land of Opportunities." We shall be glad to send you a copy and furnish you with detailed information as to any specific industry.

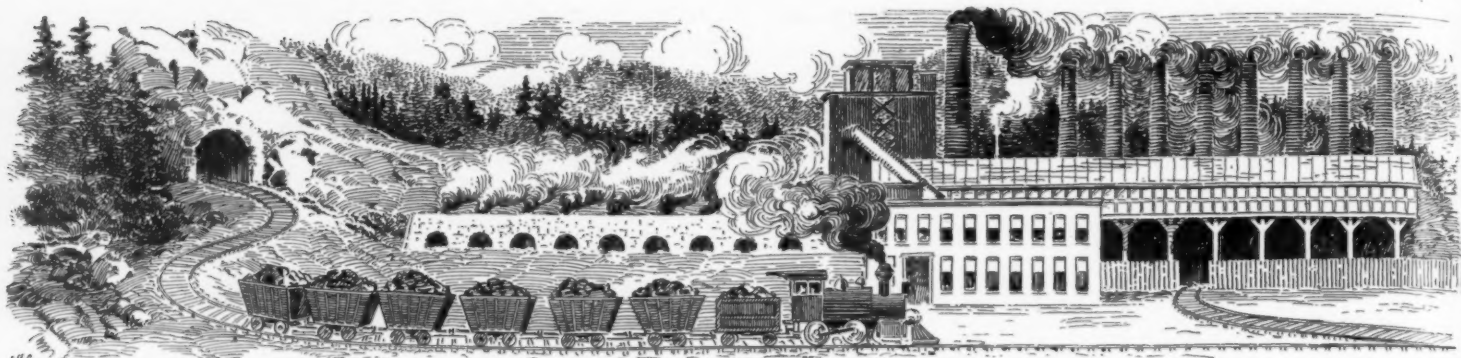
Carolina, Clinchfield & Ohio Railway

"The Road of Opportunity"

J. J. CAMPION, V.-P. and Traffic Mgr.

R. F. BREWER, Industrial Agent

Johnson City, Tenn.



The Best Locations for Manufac-

Are Along the Lines of the Southern Railway, Mobile & Ohio R. R.,

The largest and most important cities of the Southeastern States of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, Southern Illinois and Indiana, are invariably junction points for one or more lines of the Southern Railway system, with branches leading out to all points of the compass.

The territory of the Southern Railway system is without doubt the richest in all natural resources.

The mineral resources comprise the best grades of steam and coking coal, iron, natural gas, aluminum, feldspar, mica, quartz, manganese, rutile, barites, zinc, copper, lead, gold, silver, amphibole asbestos, corundum, talc, graphite,

COAL SUPPLY. The coal lands of the Southeast, tributary to the Southern Railway, embrace about 37,000 square miles. The production in 1910 amounted to about 100,000,000 tons, or 68,000,000 tons more than in 1887, a much greater increase than was made in any other section of the country. The coke output has shown a corresponding increase, in 1908 totaling 6,453,600 tons.

IRON RESOURCES. The iron supply is practically limitless. Foreign experts claim the South has more available iron ore than all of Europe. One company alone, in the Alabama district, owns lands containing 700,000,000 tons of iron ore and 2,000,000,000 tons of coal. The phenomenal increase in population of the city of Birmingham in the past ten years, amounting to over 245 per cent., has been due to the development of these great resources adjacent to that city.

TIMBER RESOURCES. About 40 per cent. of the total timber supply of the whole country is in the South. The varieties consist of pine, oak, cedar, poplar, gum, chestnut, bass, hickory, cypress, locust and others. Timber land can be purchased on the stump at exceptionally low figures.

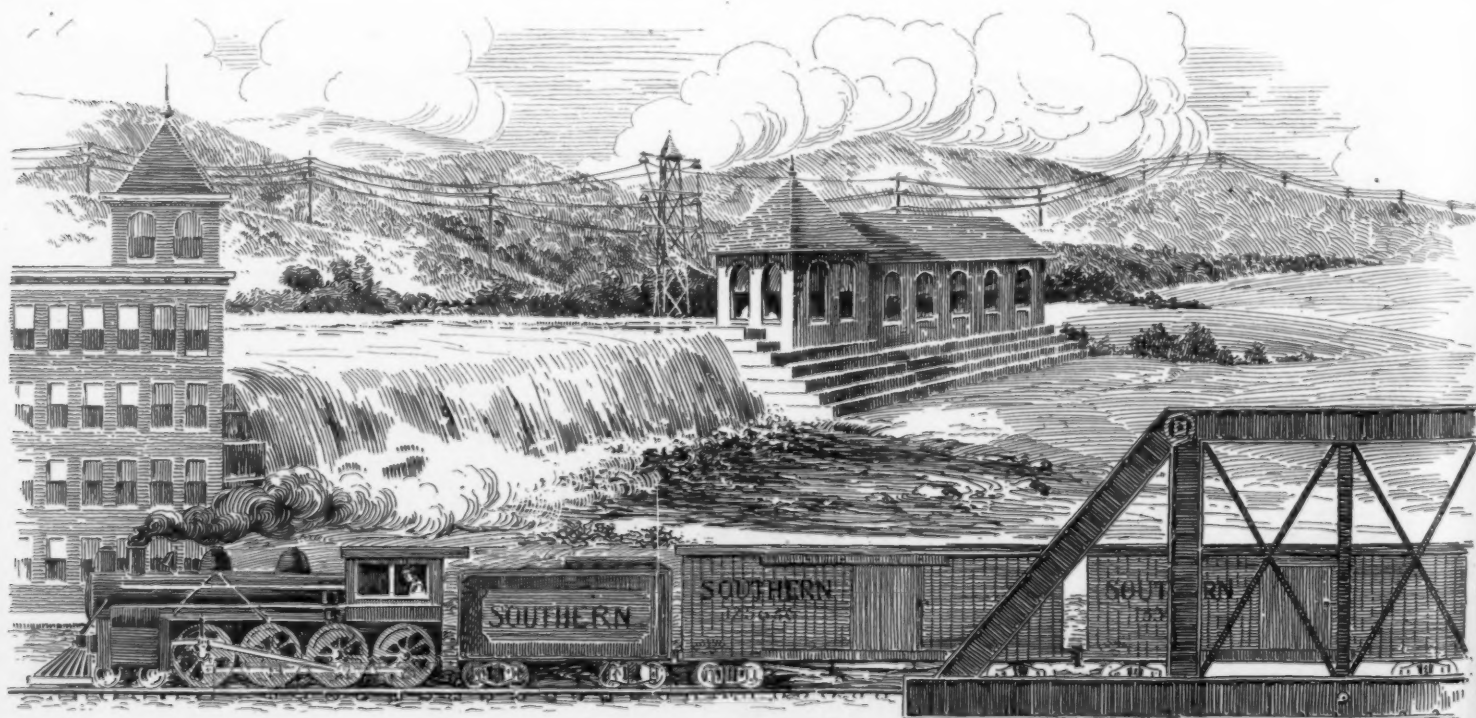
COTTON MILLS. There are twice as many cotton spindles in operation today in the South as there were in the whole United States in 1860. Along the Southern Railway system in 1911 there were 778 textile mills operating over eight and one-half million spindles. Two million and a half bales are now made into cotton cloth annually by Southern mills. The Southern Railway territory is the logical location for cotton manufacturers. It is at the actual base of the supply of raw material; it has low-priced power and intelligent white labor.

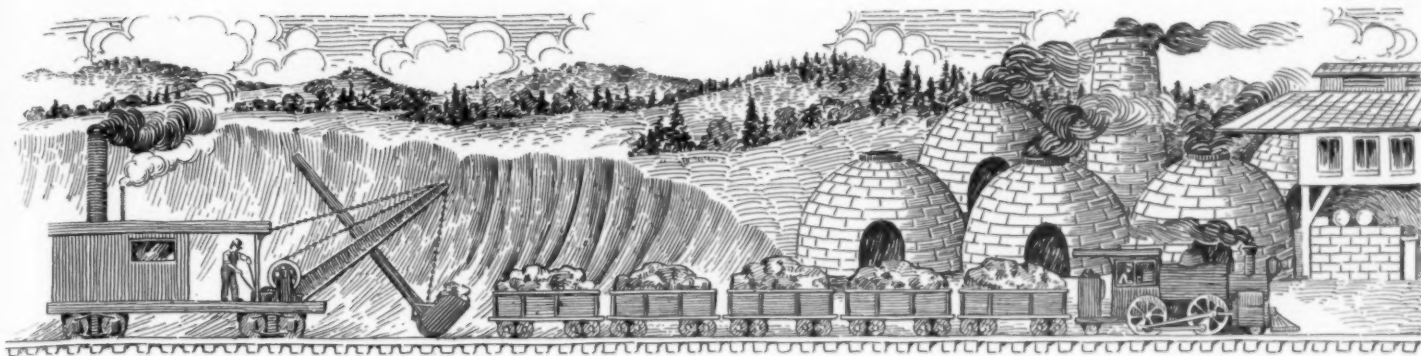
BUILDING STONE. The principal producing areas of building stone in the Southeast are along the Southern Railway. At one point alone over 15,000 carloads of granite have already been quarried. The different colors found are blue-gray, red, pink and green, and both even and coarse textures. The great State, War and Navy Building, at Washington, D. C., was constructed of Virginia granite.

The marble industry is being extensively developed, and very superior white, blue, pink, green and chocolate varieties occur in many sections. The chocolate and red marbles of Tennessee first gained their popularity by being used as an interior decorative stone in the National Capitol Building at Washington, but are used all over the United States.

BRICK AND TILE CLAYS. At the present time the principal clay industries in the South are those making brick and tile. These industries are yet in their infancy, but great futures are assured because of the low cost of production and the immense supply of raw material. The home markets are already in need of more of these products.

WATER POWER. The rivers of the South are now furnishing nearly 1,000,000 horse-power, and there are still vast amounts of power awaiting development. The very rapid growth of so many Southern cities in the past few years is due to the utilization of this resource.





Manufacturers, Investors and Farmers

Georgia Southern and Florida Railway and Virginia and Southwestern Railway

mineral paints, pottery, brick and tile clays, the very finest quality of building and monumental granite, marble and sandstone, also soapstone, slate, cement, lime and phosphate rock, marls and sulphur.

The timber supply is valuable and possibly more plentiful than that found in any other section of the country.

Last but not least looms up the wonderful agricultural possibilities of the South. The year 1910 showed an increase of 90% in value of staple farm crops produced in the nine Southeastern States over the year 1900. The combined value of all farm products from these States in 1910 was nearly two billions of dollars.

LOW-PRICED FARM LANDS. There are millions of unoccupied acres of extremely fertile farm lands in the Southeast. The prices of these lands run exceedingly low. Cut-over tracts can be purchased in many cases from \$5 per acre upwards, and run-down lands, which by scientific cultivation can soon be made very valuable, are to be bought from \$10 an acre up. The most improved, highly cultivated lands, equipped with modern, convenient buildings, can be purchased in many localities from \$30 to \$50 an acre.

LONGEST GROWING SEASON. The growing season of the South is from nine to twelve months' duration. This means two to four crops annually. No irrigation is necessary—drouths are practically unknown—no blizzards, tornadoes or other disastrous elements to contend with.

ALFALFA is causing rapid increases in value of farm lands throughout the South. Four to six cuttings per season, averaging a ton per acre to the cutting, are not uncommon. The price received in the cities varies from \$14 to \$22 per ton.

CORN. The last few years have seen remarkable renewed interest in corn-growing. Two years ago a South Carolina boy produced 228 bushels to the acre. Last year a North Carolina lad produced a yield of 235 bushels. At the New York Land Show, in 1911, in competition with growers from all over the country, a Virginia farmer won the \$1000 silver cup offered for the best thirty ears of corn.

LIVESTOCK-RAISING is another valuable asset to Southern farmers. The all-year pasturage makes it possible to produce beef at two to four cents per pound. Hogs fed on alfalfa, clovers, soy beans, peanuts or other forage crops are produced at two to four cents also.

DAIRYING. The dairy industry in the South has been sadly neglected in the

past. No section offers greater home markets for milk, butter and cheese. Prices are high and the producing cost low. Southern dairy cows are healthier than where winter housing is necessary.

POULTRY. Expensive houses being unnecessary, splendid high-priced markets prevailing, and plenty of cheap land, make the South the most profitable poultry-raising section in the country. One town alone last year on the Southern Railway shipped \$2,000,000 worth of poultry to Northern markets.

TRUCK. Southern truck growers reap fancy prices for winter vegetables. Exceptionally fine transportation facilities put early vegetables in the Northern markets in twenty-four to thirty-six hours after being taken from the field. Early strawberries bring high prices in February and March in Northern markets.

FRUITS. Southeastern apples command top prices due to their excellent appearance and flavor. The Virginia, North Carolina, Tennessee and Georgia districts present exceptional advantages for this industry. Peaches, pears, oranges, grapefruit, grapes, figs and berries yield handsome profits.

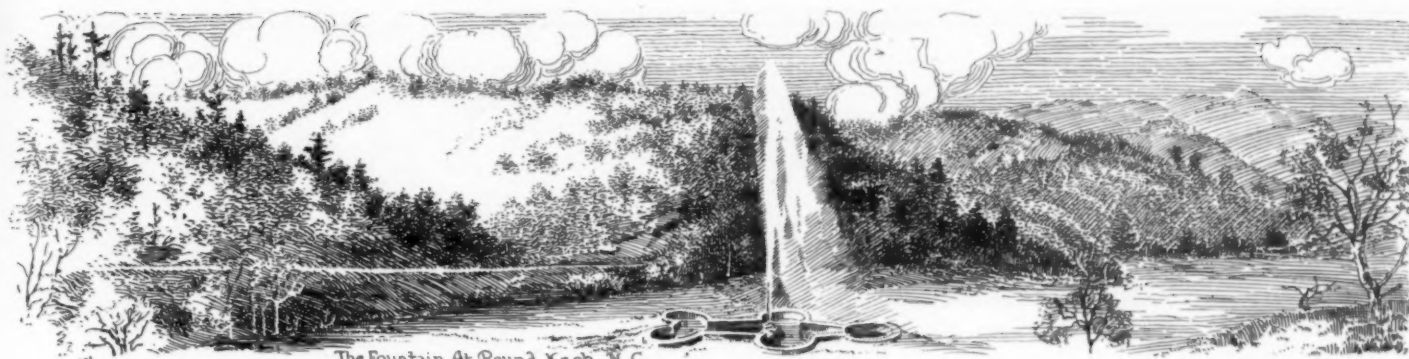
GOOD ROADS. Throughout the Southeast great strides are being made in the building of permanent and modern roads. Many millions of dollars are spent each year in this good work. The Southeast will soon rank with any other section of the country in the quality and quantity of its roads.

FOR INFORMATION in regard to manufacturing, investment or agricultural possibilities along the Southern Railway system, and literature on each State, including free subscription to the "Southern Field," communicate with

M. V. Richards, Land and Industrial Agent, Room 52, Washington, D. C.



Continued on next page.



The Fountain At Round Knob, N. C.

SOUTHERN RAILWAY,

PREMIER CARRIER OF THE SOUTH

A LAND FOR THE TOURIST

The Southeastern Section of the United States is a Land for the Tourist at all seasons of the year, abounding in scenic attractions and winter and summer resorts.

Throughout all the States in the Southeast every facility is available for pleasant and enjoyable winter and summer life and sports. There are populous cities and seaports with every municipal advantage; there are seashore and mountain resorts; there are picturesque sea-islands and quiet country places.

The abundant and delightful out-door life of the Southern winter is its chiefest charm, and no attractive feature has been overlooked or forgotten. Golf may be played upon dozens of the finest courses in the country; tennis, croquet, baseball, automobilng, riding, driving, yachting, boating, bathing, etc., are some of the sports that are almost everywhere available; while for the hunter the Southeast provides practically every feathered and furred creature from quail and squirrel to wild turkey and deer; and for the fisherman a bewildering variety of game fish from the rainbow-hued trout to the majestic Tarpon.

THE LAND OF THE SKY

In the far-famed "Land of the Sky" one finds a delightful climate, suitable for athlete, sportsman, invalid or pleasure seeker. The Southern latitude tempers its winters and robs its summers of extreme heat, thus producing an invigorating atmosphere which lures the tourist to out-door exercise, and fascinates him with the beauties of nature, and at the same time rejuvenating his whole physical being. Here the traveler may feast his soul on a new attraction each day; here the adventurous spirit will find satisfaction aplenty.

The "Land of the Sky" is that portion of Western North Carolina lying between the Blue Ridge Mountains and the Iron, Smoky and Unaka Ranges of Eastern Tennessee.

Asheville is the central city and the radiating point of a complete circle of attractions of this favored region. There are any number of delightful resorts nearby to

Asheville, including Hendersonville, Tryon, Flat Rock, Saluda, Brevard, Lakes Toxaway and Fairfield, Hot Springs, Waynesville, Balsam, Black Mountain, Montreat, Murphy and Hickory. It is at Black Mountain that passengers leave the Southern Railway for Mt. Mitchell (6,711 feet high).

OTHER DELIGHTFUL PLACES

Not only is the "Land of the Sky" noted as a resort section, but as stated, the entire Southeastern Section of this country abounds in scenic attractions and winter and summer resorts, including such famous places as Augusta, Ga.; Aiken, Charleston, Columbia and Summerville, S. C.; Savannah and Brunswick, Ga., and the numerous resorts in Florida; also the Gulf Coast points; as well as the resorts in East Tennessee, Kentucky, Southern Indiana, etc.

HOTEL FACILITIES

At all of these resort points are to be found excellent hotels of the highest grade; those of lesser pretensions and more moderate charges; boarding houses, villas and cottages, where guests are made welcome and comfortable, whether their stay be short or long.

PASSENGER TRAIN SERVICE

The entire Southeastern Section is traversed by through Passenger Train Service of the Southern Railway, including specialized and fast limited trains; exclusive Pullman trains; Pullman Parlor Car service; Southern Railway Dining Car service; electrically lighted equipment, and in fact the most complete and best service ever offered the public.

For detailed information, including fares, time-tables, maps, booklets, etc., apply to any Agent of the Southern Railway or connecting lines, or

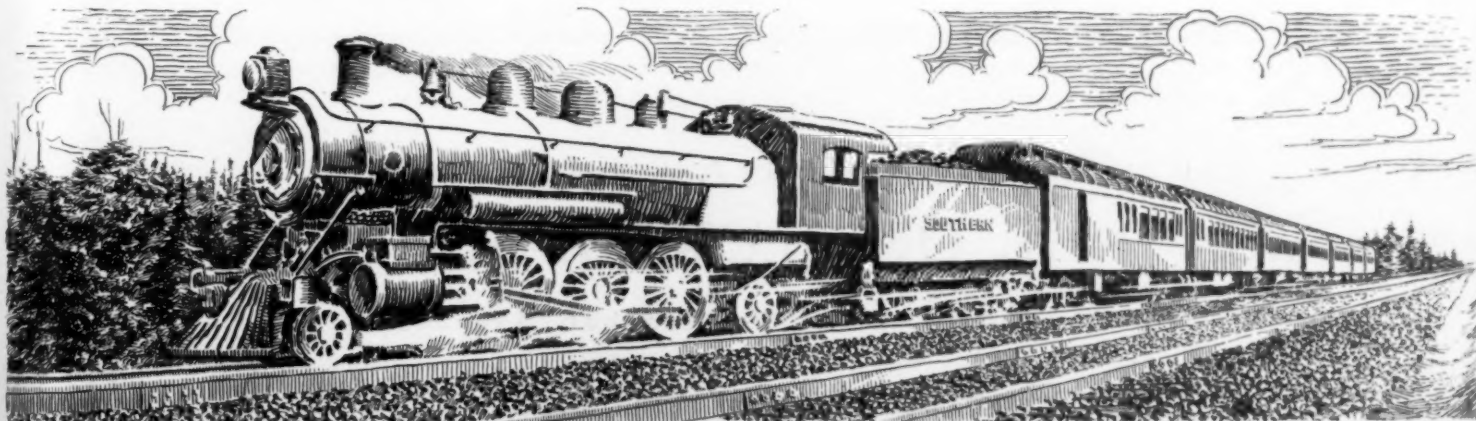
S. H. HARDWICK,

Passenger Traffic Manager,

H. F. CARY,

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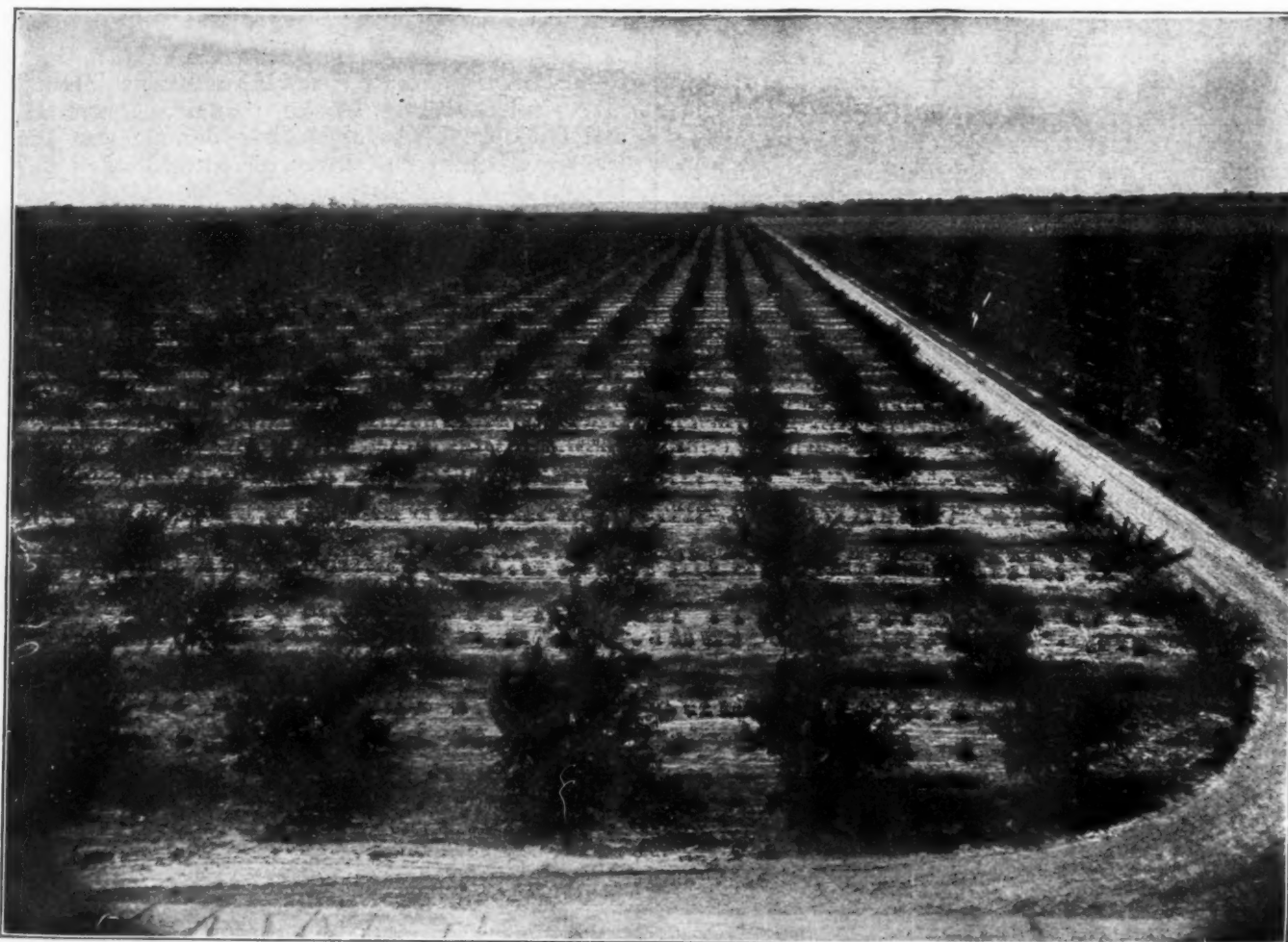
WASHINGTON, D. C.



GEORGIA AND ALABAMA

The Homeseekers' Opportunity That Was Overlooked

The section traversed by the CENTRAL OF GEORGIA RAILWAY is truly a country of agricultural opportunity that has been overlooked. It is a country of industrial opportunity as well, but it has not been overlooked by the Manufacturer as it has by the Homeseeker. The principal advantage for the Homeseeker is the low-priced land, which earns more net money than land which costs three or four times as much where unimproved land is scarce.



Peach Orchard with Young Cotton between the Rows near Fort Valley, Georgia, taken July 6, 1910.
That year there were 5,743,795 bearing peach trees in orchards along the Central of Georgia lines.

The peach industry is an important and well-known feature of Central of Georgia territory, but our greatest opportunity is for the general farmer, because of the large local demand at good prices for all the general farm products with which he has had long experience.

Write for free book of pictures supported by signed statements from the men who grew the crops and raised the live stock, which proves the agricultural possibilities of our section; and let us explain how we can help find just the farm that is wanted.

J. F. JACKSON, Agricultural Agent

CENTRAL OF GEORGIA RAILWAY

231 Broad St., Savannah, Ga.

Agricultural and Manufacturing Opportunities in the South

The Southern States traversed by the Seaboard Air Line Railway can clearly demonstrate their great desirability and the opportunities offered, which await development to a much greater proportion.

The Thirteenth Census reports are convincing. Cotton manufacturing ratio of increase the highest reported. The raw material at hand, labor conditions desirable, climate unexcelled, proximity to markets, opening of Panama Canal and direct trade relations with South America, better conditions for reaching markets of Far East, are additional attractive features of the upward progress of this great and growing industry.

Water power development and the transmission of reasonable priced electric power present a factor of value to future manufacturing in the South.

The Southern States have the greatest area of standing timber.

Material for successful Cement Manufacture.

Clays for Brick, Tile, Sewer Pipe, etc.

Iron Ore in abundance assures the continued growth of the iron and steel industries.

A climate equable the year round, no extremes of heat or cold.

Crop growing season greater in number of days than any other section.

Located in the humid area with maximum rain-fall necessary to assure successful farming operations.

The varied soil conditions present possibility of a very widely diversified crop growing—and the ratio of increase in population steadily increases the market opportunities for the Farmer, Gardener, Truck-grower, and Fruit-grower, and for the successful developments of Cattle-raising, Poultry-farming, Dairy-farming.

We can point the interested inquirer to attractive conditions in Virginia, North Carolina, South Carolina, Georgia, Florida, and Alabama, and will appreciate the opportunity.

CHAS. R. CAPPS,
Vice President

J. A. PRIDE,
General Industrial Agent

NORFOLK, VIRGINIA

CAROLINA COAST COUNTRY

More than a Million Acres of Rich Farming Lands. Not Worn Out, but Virgin Soil, Two to Ten Feet in Depth, Underlaid with a Good Clay and Marl Formation.

Only Twelve Hours from New York

Nearness to the great Northern cities, cheap transportation, a mild climate and low-priced land, make this the best location for farm, family and resort homes. The best colonization spot in America. Twenty million people are within reach of a produce freight rate of only 25 cents per barrel from Norfolk, Va. These lands may be obtained in any desired area, from the 20 acre plot to tracts of 50,000 acres and upwards.

Winter Homes Trucking Farming
Hunting and Fishing

The Great Gulf Stream Land Midway Between North and South
Without Extremes of Heat or Cold
Summer All Winter—Winter All Summer

The construction of the Norfolk Southern Railroad system through Eastern North Carolina has recently opened up this section of the State to advantageous settlement. These lands are now rapidly coming into demand by people from other States, and development and selling companies will find a quick and profitable market for every acre as fast as it is made ready for the farmer.

Here also will the farmer, the trucker and the livestock man find ready and rich acres waiting for him; acres that for fertility, healthfulness and nearness to market stand unequaled in America.

Send for free Colored Maps and Illustrated Descriptive Booklets on

"CORN, COTTON and CASH"

Farming Lands, Winter Homes or Hunting and Fishing

Any additional information desired may be obtained by writing the main office.

W. W. CROXTON, General Passenger Agent

B. E. RICE, Land and Industrial Department

Desk 518

Norfolk Southern Railroad
NORFOLK, VIRGINIA

"The Promised Land of Health and Prosperity" is Florida

Between 1900 and 1910 the population of the United States increased	21 %
During the same period the population of Florida increased.....	42.4%
The increase in value of farm lands in the United States between 1900 and 1910 was	118 %
The gain in Florida during the same years was.....	203 %
The value of Florida's 12 leading diversified crops common to most of the country (and not including the citrus crops, so large a factor in the agricultural interests of this State) increased from \$5,677,000 in 1899 to \$15,104,000 in 1910, a gain of.....	126 %
The gain in the whole country for the same crops was.....	81.1%
Between 1900 and 1909 capital invested in factories increased in the whole country.....	108.8%
In Florida the rate of gain was.....	152.6%
The value of factory products increased during the same time in the United States.....	81.7%
The value of factory products in Florida increased.....	112.7%

In each one of these comparisons the rate of increase in Florida was far greater than that of the entire country during the same period.

These remarkable illustrations of well-rounded progress combine to emphasize the wonderful agricultural and industrial activities and possibilities of the State.

This growth, while showing a great percentage of increase in the last decade, has been a steadily advancing one; and when the many large undertakings that are under way in Florida, such as the draining of the Everglades, extension of railroads, developing of new farming and trucking areas, etc., are considered, all of which will open up opportunities of even wider magnitude, a much greater advance can be safely predicted for the next ten years.

A State which is drawing an ever-increasing number of health and pleasure seekers, of permanent settlers—some to engage in general agriculture, some in manufactures, some in fruit growing—oranges, grapefruit or kindred interests, some in trucking, some in dairying, and some in chicken raising—is an ideal land for investigation on the part of those who want

The most perfect all-the-year-round climate to be found in America;
Manufacturing and agricultural advantages of vast and varied extent;
Transportation facilities that are rapidly being extended to meet the
ever expanding business of the State.

Florida is the State.

"The Call of Florida" is being heard throughout the land. Toward Florida thousands of people are turning their faces as to the "Promised Land of Health and Prosperity." The progress of the last ten years is only a hint of what the future will show.

Active, energetic, live people want to live in an active, energetic, live community, where the tide of incoming population gives every man a chance to develop every latent power in him.

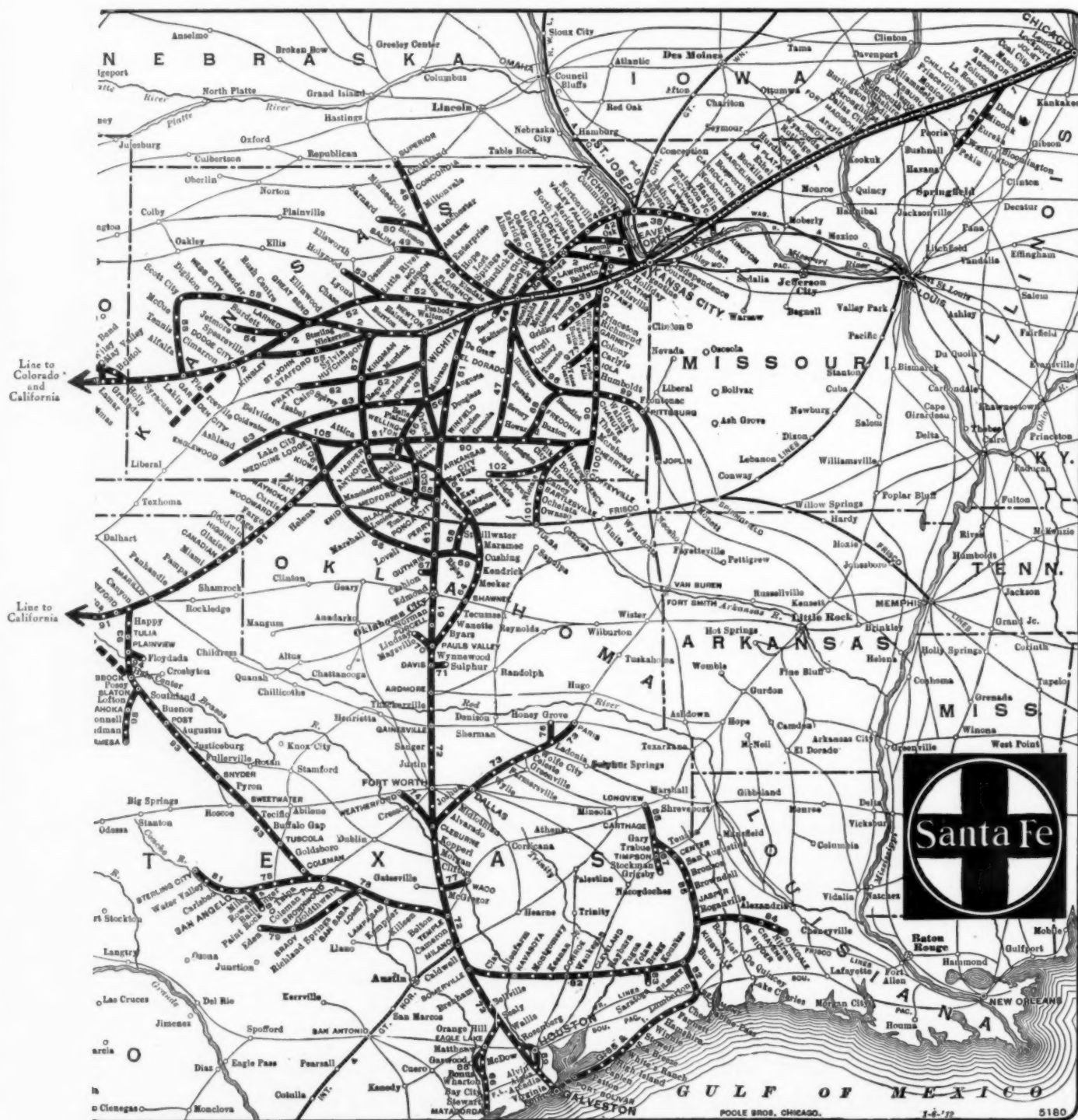
Florida is the place.

Florida East Coast Railway

J. E. INGRAHAM, Vice-President

ST. AUGUSTINE, FLA.

A Home Market Ready To Take Your Product



The Santa Fe mileage in Kansas, Oklahoma and Texas is full of exceptional opportunities for industrial enterprises.

Good labor conditions—abundant raw material—unsurpassed transportation, and a fast developing country offering a ready market for all classes of product.

Detailed information regarding any specific territory with business possibilities of any character of industry may be had by addressing

WESLEY MERRITT, Industrial Commissioner A., T. & S. F. Ry.,
1122 Railway Exchange, Chicago.



Agricultural and Industrial Resources of Louisiana and Mississippi

No railroad in America passes through a territory offering more inviting opportunities to the investor, the manufacturer, the farmer and the homeseeker, than those portions of Louisiana and Mississippi traversed by the Illinois Central and the Yazoo and Mississippi Valley Railroads.

Here are millions of acres of splendid land that are but awaiting the brains and energies of land operators and new settlers to transform them into the most productive farm lands in America—lands that will yield four bountiful crops a year, and lands, on portions of which, successful truck farming and fruit growing operations are now being extensively carried on.

Here are millions of acres of land suitable for great drainage operations, larger than the Valley of the Nile, and other millions of acres of land from which the timber has been cut, presenting unequalled opportunities for the great land-development operators, for colonization companies, etc. The "land hunger" of the world will soon force prices of this land to much higher figures than now prevail.

Both States also possess the soil, climate and other requirements for raising big crops of those very grains, grasses and other fattening stock foods that are needed for producing high-grade live-stock—an industry that is constantly expanding.

Industrially, Louisiana and Mississippi are likewise destined to see wonderful growth. Both States have valuable diversified raw materials that are more and more attracting the attention of manufacturers.

New plants are continually being established to take up the opportunities offered by the vast supplies of valuable hardwoods, clays and other raw materials, and in live-stock packing, fertilizer and other industries.

Louisiana and Mississippi enjoy unequalled fast freight service to the best markets in every direction, which, combined with an abundance of good labor and fine climate, create conditions that manufacturers desiring an ideal location can investigate to advantage.

As a factor in helping to develop and to handle the commerce of a great section of the country, the Illinois Central realizes its responsibility to the people it is serving and the people whom it invites to locate along its lines. Its policy is that of the broadest co-operation and encouragement.

We invite your careful investigation of the splendid advantages enjoyed by Louisiana and Mississippi for industrial and agricultural development, and shall be glad to place before you facts regarding specific openings.

ILLINOIS CENTRAL RAILROAD

J. C. CLAIR, Industrial and Immigration Commissioner

CHICAGO, ILL.

Richmond, Fredericksburg & Potomac R. R. Washington Southern Ry.

The Quick All-Rail
Route Between
The North and
the South



Double Track
Heavy Steel Rails
Washed Gravel Roadway
Modern Equipment

RICHMOND, VIRGINIA, is the logical and geographical gateway between the North and the South. When routing freight shipments, carloads or less, be sure to specify "VIA RICHMOND" so that quick movement via the Short Line may be insured.

Fast and Frequent Passenger, Express and Mail Trains

S. C. LEAKE, Commercial Agent

W. M. TAYLOR, Traveling Freight and Passenger Agent

W. P. TAYLOR, Traffic Manager

Place Your Plant Where the Need for It Is Greatest

The best place for a new business is a new country. You will make most where you are *needed* most. Why buck up against fixed competition in older sections when a clear path is open to you in the prosperous Southwest?

If you are about to start some new business, or to establish a branch of an old—whether it is a factory or retail store—you would be immensely interested in the *unfilled wants*

—along the St. Louis Southwestern Railway Lines (Cotton Belt Route)

Now there are splendid openings for wood-working plants of all kinds, clay plants, cottonseed oil mills, roller mills, shoe last factories, farm implement factories, canneries, creameries, etc.

The *natural* demand for certain lines in many communities is already sufficient to assure their *immediate* success, if properly conducted. There is hardly any community that will not *substantially* co-operate with a *needed* industry. The cotton Belt's Industrial Department has the most minute facts on the needs in every city and section—facts that enable it to connect the *right* business with the *right* location.

If you are about to establish an industrial plant, you cannot give too much thought to raw materials, railroad facilities and markets. No matter what sort of a product you have in mind to manufacture, at *some* point along the Cotton Belt's lines Southwest the *raw* material for that product can be secured with the greatest ease and at the least cost. And the **COMPLETE SHIPPING FACILITIES** offered by the Cotton Belt Route should alone be a big inducement for the establishment of your business. The Cotton Belt Route maintains the most regular fast freight service of any road running to the Southwest—to points in Missouri, Arkansas, Louisiana, Texas, Mexico, New Mexico, Arizona and California, and provides *through package* cars between the

North and the principal points in the Southwest. Its complete switching facilities, punctual movement of cars to platforms and recognized *willingness* to co-operate in every way toward the success of a business along its lines should be a big incentive to any intending manufacturer.

In the matter of markets, a location along the Cotton Belt's lines Southwest is unparalleled. It would place you in *direct* touch, not only with the big cities of the North, but the prosperous, fast-growing and *now-to-be-reckoned-with* sections of the Southwest. Write to W. J. Doyle, Asst. Agrl. and Ind. Agt., Pierce Bldg., St. Louis; he will be glad to go into details with you about the special openings Southwest for *your* line. Give him this opportunity. His help is without cost or obligation.

If you are interested in the Cotton Belt's efficient freight service Southwest, write to H. E. Farrell, Frt. Traf. Mgr.; J. P. Park, Gen'l Frt. Agt., Pierce Bldg., St. Louis.

For the inducement of homeseekers and investors who want to look over the Southwest, the Cotton Belt operates low fare excursions on the first and third Tuesdays of each month.

The cost of ticket is much less than regular fare; allows you stop-overs free and gives you 25 days to look around.



If you would like to read up more on the Southwest before you go, write today for these free illustrated books: "Texas," "Arkansas, Homes and Harbors," "The Rise of Rice in Arkansas," "Profitable Products of East Texas," "Southeast Missouri Valley and Ridge," "Northwest Louisiana." They will be of great help to you in deciding on just what section would most likely suit you. Write today.

E. W. La BEAUME, G. P. and T. A., St. L. S.-W. Ry.
Pierce Building, St. Louis

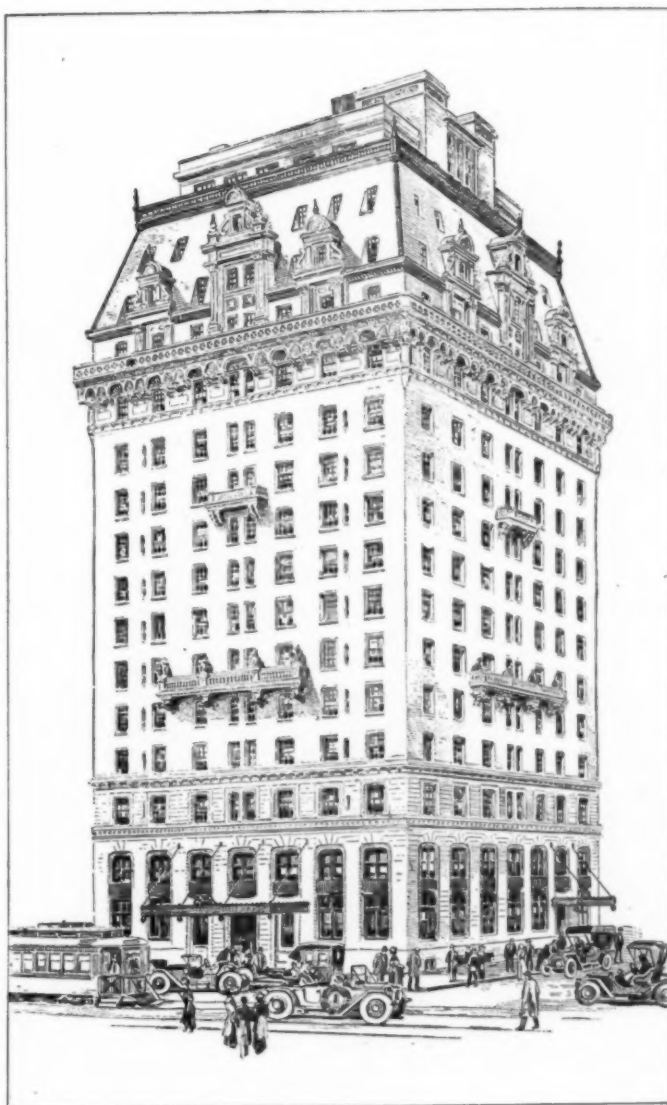
J. F. LEHANE, G. F. and P. A., St. L. S.-W. Ry. of Texas
Tyler, Texas

The EMERSON

Baltimore's Newest and Most Complete Hotel
The Rendezvous of Southerners Visiting Baltimore

400 Rooms, single or in suites, with or without bath.

Irrespective of baths, each room is furnished with circulating ICE water, as well as running hot and cold water.



As fireproof a building as human ingenuity can construct, embodying every modern convenience.

Ideally central in its location and peculiarly adapted to the needs of the transient.

BALTIMORE AND CALVERT STREETS

The Emerson was formally opened Oct. 30th last. Already it is awarded a position among what are conceded to be America's foremost hotels.

Distinctly individual throughout, with its three beautiful dining rooms and their cuisine of both French and Southern style, and with the comfort afforded by its homelike rooms, The Emerson is more than a conventional hotel—it is a luxurious home, pleasing to ladies as well as gentlemen.

Special rooms for the accommodations of Board Meetings.

Sample rooms—limited in number—of high character.

\$1.50 a day upward.

European Plan.

The Consolidation Coal Company

Owning over 300,000 acres of the best coal land in the world in Kentucky, West Virginia, Pennsylvania and Maryland is operating over 70 bituminous coal mines and continually adding others.

The total volume of coal in these holdings, available for mining, is conservatively estimated at 2,150,000,000 tons or a reserve of coal ample to last for two centuries.

Between 800,000,000 and 900,000,000 tons of this minable coal are located in the Elkhorn district and is conceded, by authorities, to be the highest grade coking coal that exists probably anywhere in the world.

Millions of dollars are being expended by the Company in opening up its Elkhorn property and in character of construction and equipment it will not be exceeded by any other mining operation anywhere.

The coal from the Company's mines in West Virginia, Pennsylvania and Maryland has earned an enviable reputation throughout the greater part of this country from the Great Lakes to the Gulf and from the Atlantic Seaboard to the Mississippi River and also in numerous foreign countries by reason of its exceptional high quality and ability to produce the greatest possible steam efficiency.

The equipment of the Company's mines is of the most approved type known to the industry and its methods of preparing and handling its output is such as to insure to the consumer a fuel that will measure up to every test and give the greatest economy in the production of heat and power and in plant operation.

Different grades of Consolidation coal are adapted to different needs and a corps of expert engineers and chemists is placed at the service of the consumer to enable him to select the exact grade of coal that will give the most economic and efficient service.

In direct control and management of these vast operations are men with life-long experience in the coal mining industry and a thorough-going, practical knowledge of modern methods of distribution and sale of the commodity to meet modern needs.

The Consolidation Coal Company

INCORPORATED

F. W. WILSHIRE, General Manager of Sales

C. VON H. KALKMANN, Asst. Gen. Mgr. of Sales

1 Broadway, New York

OFFICES:

Portsmouth, N. H., C. W. Gray, Supt.,
137 Market Street.

Philadelphia, W. M. Wilshire, Mgr.,
Land Title Bldg.

Boston, R. C. Gillespie, Manager,
50 Congress Street.

Baltimore, H. C. Thomas, Manager,
Continental Bldg.

New York, J. E. Parsons, Manager,
1 Broadway.

Washington, W. A. Leetch, Manager.

E. M. MANCOURT, Western Mgr.
Fisher Bldg., Chicago, Ill.

Detroit, Ford Bldg.,
C. A. Chambers, Mgr.

Chicago, Fisher Building,
J. B. Beardslee, Mgr.

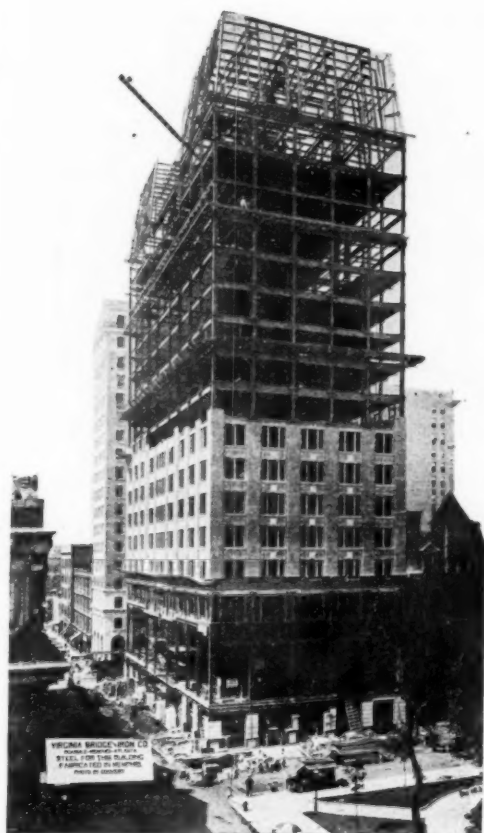
Cincinnati, Traction Bldg.,
W. C. Rogers, Mgr.

Louisville, Ky., Paul Jones Bldg.,
G. E. Davis, Mgr.

General Offices: Continental Bldg., Baltimore, Md.

North Western Fuel Co., Pioneer Press Bldg., St. Paul, Minn.

LONDON, G. W. Rutherford, European Mgr., Billiter Sq. Bldg.



Exchange Building, Memphis, Tenn.



S. A. & A. P. Ry. over Colorado River in Texas

Some Striking Illustrations of Southern
Upbuilding in Which We Participated

VIRGINIA BRIDGE & IRON COMPANY

General Offices

ROANOKE, VA.

Branch Offices

MEMPHIS

ATLANTA

NEW ORLEANS

**RUSH ORDERS
FILLED
FROM STOCK**

Works

ROANOKE

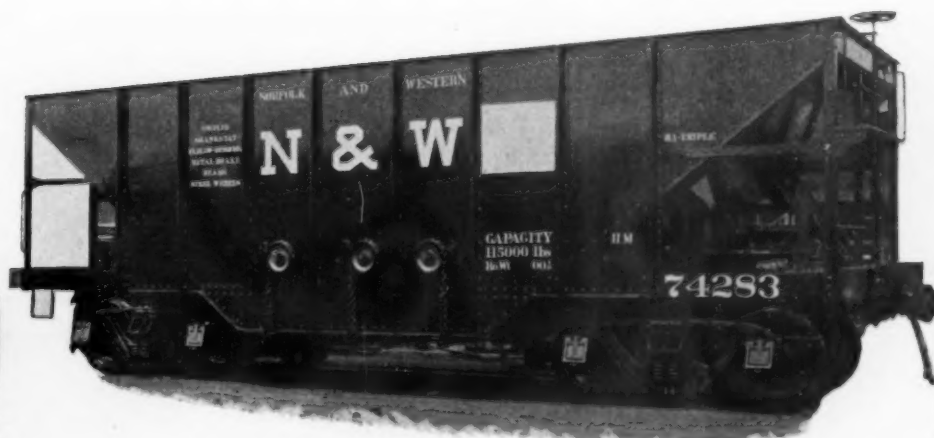
MEMPHIS

ATLANTA

Annual Capacity 100,000 Tons



Lift Bridge, Florida East Coast Ry. in Florida



UNDER THE MANAGEMENT OF
J. E. CONANT & CO., (Auctioneers)
OF LOWELL, MASSACHUSETTS
— MEANS —

METHODS that are straightforward, methods that have proved standard, wide publicity that actually notifies those who are or may become interested, an attendance at the sale of genuine buyers of such size as to create real competition among bona fide bidders and results that are invariably satisfactory. Combinations not endured. In going to the public with a manufacturing plant it is of the utmost importance that the right decision has first been made as to offering the property as a whole or divided; of quite as much consequence is the condition the property is in when it goes to exhibition and sale; lack of proper presentation in catalogue, trade publication and newspaper cannot be overlooked; to partially do or not to do any of these things means results that are not satisfactory. Acting as auctioneers the day of sale is merely incidental to the full completion of the transaction. An established and reliable following is a necessity; mailing lists in hand created through interested applicants and actual buyers are invaluable. Greater and above all things, knowledge and familiarity with the work temporarily in hand is positively essential for maximum success. All work based solely upon personal experience covering many decades of continuous business. No guesses made, no imaginations followed, no experiments tried. Every sale is a business proposition in itself, its particular possibilities must be carefully worked out and taken advantage of. There are no prescribed formulas to follow or cut-and-dried methods by which to proceed. The last decade alone has brought to this office unsolicited the management of the sale of more than 170 manufacturing properties in fourteen or fifteen states of the country.

ESTABLISHED 1791

122nd YEAR

Classified Index of Advertisements

Accounts Receivable Discounted.
Manufacturers' Finance Co., Baltimore, Md.

Alkalies.

Matheson Alkali Works, Saltville, Va.

Apple Orchards.

Appalachian Apple Orchards, Atlanta, Ga.

Asbestos and Magnesia Supplies.

Southern Pipe Covering Co., Richmond, Va.

Asphalt. (Paving and Roofing.)

Gulf Refining Co., Pittsburgh, Pa.

Auctioneers. (Business and Industrial Properties.)

Conant & Co., J. E., Lowell, Mass.

Automatic Stop Motions.

General Mch. Works, York, Pa.

Bags.

American Bag Co., Memphis, Tenn.

Bankers and Brokers.

Rowman & Co., D. Arthur, St. Louis, Mo.
Castell, Wm. J., New Orleans, La.
Middendorf, Williams & Co., Baltimore, Md.
Sessions Loan & Trust Co., Marietta, Ga.
Texas Loan & Guaranty Co., Houston, Tex.
U. S. Bond & Mortgage Co., Dallas, Tex.
Williams & Sons Co., John L., Richmond, Va.

Banks. (National and Savings.)

Amer. Exchange National Bank, Dallas, Tex.
Bank of Clearwater, Clearwater, Fla.
Bank of Wauchula, Wauchula, Fla.
Birmingham Trust & Savings Co., Birmingham, Ala.
Central Savings Bank, Spartanburg, S. C.
First National Bank, Key West, Fla.
First National Bank, Huntington, W. Va.
First National Bank, Richmond, Va.
Huntington Nat'l Bank, Huntington, W. Va.
Merchants' National Bank, Baltimore, Md.
National Bank of Virginia, Richmond, Va.
National Mechanics' Bank, Baltimore, Md.
National Bank of Commerce, Norfolk, Va.
National Exchange Bank, Baltimore, Md.
Palmetto Nat'l Bank, Columbia, S. C.
People's Bank, Anderson, S. C.
People's Bank of Clearwater, Clearwater, Fla.
Savings Bank of Baltimore, Baltimore, Md.
State Bank of Maryland, Baltimore, Md.
Union National Bank, Houston, Tex.
Union Savings Bank & Trust Co., Huntington, W. Va.

Barges and Scows. (Concrete.)

Furst Concrete Scow Con. Co., Baltimore, Md.

Barrels. (Fish and Potato.)

Wauchula Land & Timber Co., Wauchula, Florida.

Bars, Hoops, etc. (Steel.)

Atlanta Steel Co., Atlanta, Ga.
Texas Rolling Mill Co., Fort Worth, Tex.

Bedsteads. (Brass and Iron.)

Foster Bros. Mfg. Co., Baltimore, Md.

Belting. (Leather, Cotton, etc.)

American Supply Co., Providence, R. I.
Bailey-Libby Co., Charleston, S. C.
Boston Belting Co., Boston, Mass.
Chesapeake Belting Co., Baltimore, Md.
Candy Belting Co., Baltimore, Md.
Williams & Sons, I. B., Dover, N. H.

Boilers.

Allen, Herbert F. L., Washington, D. C.
Bailey-Libby Co., Charleston, S. C.
Price Machinery Co., S. M., Norfolk, Va.
Schiffel's Sons Co., J. S., Macon, Ga.
Stratton & Bragg Co., Petersburg, Va.

Bolts, Nuts, Washers.

Hoffman & Co., Inc., R. C., Baltimore, Md.
Texas Rolling Mill Co., Fort Worth, Tex.

Bonds. (Surety—All Kinds.)

Fidelity & Deposit Co., Baltimore, Md.
Maryland Casualty Co., Baltimore, Md.

Bookcases. (Sectional.)

Ruse & Thompson, Baltimore, Md.

Boxes, Baskets, Crates, Hampers. (For Fruit.)

Wauchula Land & Timber Co., Wauchula, Florida.

Brazing. (Cast Iron.)

Richmond Mach. Wks., Inc., Richmond, Va.

Brick. (Building.)

Fulcher Brick Co., Nashville, Tenn.
Hood Brick Co., B. Midlin, Atlanta, Ga.
Legg Brick Co., Calhoun, Ga.
Sibley-Menge Brick & Coal Co., Birmingham, Ala.
Southern Brick & Terra Cotta Co., Columbus, Georgia.
Standard Brick Co., Macon, Ga.
Withers, B. F., Charlotte, N. C.

Brick. (Face.)

Hood Brick Co., B. Midlin, Atlanta, Ga.
Legg Brick Co., Calhoun, Ga.
Sibley-Menge Brick & Coal Co., Birmingham, Ala.
Southern Brick & Terra Cotta Co., Columbus, Georgia.
Standard Brick Co., Macon, Ga.
Withers, B. F., Charlotte, N. C.

Brick. (Fire.)

Harbison-Walker Refractories Co., Birmingham, Ala.
Hoffman & Co., Inc., R. C., Baltimore, Md.
Southern Brick & Terra Cotta Co., Columbus, Georgia.
Standard Brick Co., Macon, Ga.
Stevens' Sons Co., H., Macon, Ga.
Withers, B. F., Charlotte, N. C.

Brick. (Paving.)

Peckles Paving Brick Co., Portsmouth, O.
Standard Brick Co., Macon, Ga.

Bridges. (See Structural Steel and Iron.)

Builders and Contractors.

Fulcher Brick Co., Nashville, Tenn.
Hollingsworth & Co., J. E., Memphis, Tenn.

Building and Loan Associations.

National Building & Investment Co., San Antonio, Tex.

Building Supplies.

Withers, B. F., Charlotte, N. C.

Burners. (Crude Oil.)

Vandaveer-Stoy, Houston, Tex.

Business Opportunities.

Denton, G., San Antonio, Tex.
Farley, J. L., care Manufacturers Record.
Sperry & Co., Marcus E., Tampa, Fla.
Troy Co., W. B., Tupelo, Miss.

Cableways. (Aerial.)

International Cable Railway Co., Balto., Md.

Cans. (Galvanized Oil.)

Delfos Mfg. Co., Delfos, O.

Cars. (Steel—Lumber, Brick, etc.)

Merry Steel Truck Co., Memphis, Tenn.

Castings. (Iron.)

Enterprise Iron Works, Fort Worth, Tex.
Schofield's Sons Co., J. S., Macon, Ga.
Shelby Iron Co., Shelby, Ala.
Stratton & Bragg Co., Petersburg, Va.

Catalogues, Booklets, etc. (Printing.)

Fleet-McGinley Co., Baltimore, Md.

Cement.

Alpha Portland Cement Co., Easton, Pa.
Cluchfield Portland Cement Co., Kingsport, Tennessee.
Dixie Portland Cement Co., Chattanooga, Tennessee.
Kirkpatrick Sand & Cement Co., Birmingham, Ala.
Security Cement & Lime Co., Baltimore, Md.
Standard Portland Cement Co., Birmingham, Alabama.
Tidewater Portland Cement Co., Balto., Md.
Withers, B. F., Charlotte, N. C.

Chemists. (Industrial.)

Agee, G. W., Memphis, Tenn.
Froehling & Robertson, Richmond, Va.
Lawrence, James C., Memphis, Tenn.

Cities and Towns.

Aransas Pass, Tex.—Aransas Pass Com. Club.
Asheville, N. C.—Board of Trade.
Bastrop, Tex.—Bastrop Commercial Club.
Bedford City, Va.—Board of Trade.
Beville, Tex.—Young Men's Progressive League.
Bishop, Tex.—Commercial Club.
Bluefield, W. Va.—Chamber of Commerce.
Cheraw, S. C.—Cheraw Board of Trade.
Clarksburg, W. Va.—Clarksburg Board of Trade.
Clearwater, Fla.—Bank of Clearwater.
Corey, Ala.—Corey Land Co.
Corpus Christi, Tex.—Corpus Christi Commercial Club.
Dade City, Fla.—Board of Trade.
Dalworth, Tex.—Dalworth Co., Grand Prairie, Texas.
Etowah County, Ala.—(Gadsden District)—Business Men's Club.
Fitzgerald, Ga.—A. B. Cook, Mayor.
Gadsden, Ala.—Business Men's Club.
Gainesville, Ga.—Gainesville Chamber of Commerce.
Galveston, Tex.—Galveston Com. Assn.
Helena, Ark.—Business Men's League.
Henderson, N. C.—Chamber of Commerce.
Houston, Tex.—Chamber of Commerce.
Huntington, W. Va.—Chamber of Commerce.
Key West, Fla.—Chamber of Commerce.
Laurinburg, N. C.—E. H. Gibson, Mayor.
Lumberton, N. C.—Commercial and Industrial Club.
Lynchburg, Va.—Chamber of Commerce.
Marion, N. C.—Chamber of Commerce.
Memphis, Tenn.—Business Men's Club.
Morgantown, W. Va.—Morgantown Board of Trade.
Port Aransas, Tex.—Commercial Club.
Rock Hill, S. C.—Chamber of Commerce.
Rockingham, N. C.—W. M. Everett, Mayor.
Rockport, Tex.—Rockport Commercial Club.
Romney, W. Va.—South Branch Board of Trade.
Rutherfordton, N. C.—A. O. Hook, Mayor.
San Antonio, Tex.—Chamber of Commerce.
Seguin, Tex.—Commercial Club.
Tampa, Fla.—Board of Trade.
Tarpon Springs, Fla.—Board of Trade.
Troy, N. C.—Hoke-Hill Real Estate & Investment Co., Tryon, N. C.
Wadesboro, N. C.—Wide Awake Club.
Waynesboro, Va.—First National Bank.
Wauchula, Fla.—Wauchula Land & Timber Co.
West Virginia (State of)—West Virginia Board of Trade, Wheeling, W. Va.
Wheeling, W. Va.—Board of Trade.

Coal.

Ala. Consol. Coal & Iron Co., Birmingham, Alabama.
Cherokee Coal Co., Knoxville, Tenn.
Cluchfield Coal Corp., Dante, Va.
Cluchfield Fuel Co., Spartanburg, S. C.
Consolidation Coal Co., Baltimore, Md.
Yolande Coal & Coke Co., Birmingham, Ala.

Coke.

Ala. Consol. Coal & Iron Co., Birmingham, Alabama.
Yolande Coal & Coke Co., Birmingham, Ala.

Contractors. (Canal, Drainage, etc.)

Furst-Clark Constr. Co., Baltimore, Md.
Maryland Dredging & Contg. Co., Balto., Md.
McWilliams, R. H. & G. A., Chicago, Ill.

Cotton Goods.

Woodward, Baldwin & Co., Baltimore, Md.

Cotton Mill Machinery.

Draper Co., Hopedale, Mass.

Cotton Mill Supplies.

American Supply Co., Providence, R. I.

Cottonseed Oil Machinery.

Buckeye Iron & Brass Wks., Dayton, O.
Callahan Co., W. F., Dayton, O.
Cardwell Machine Co., Richmond, Va.

Couplings.

Dodge Mfg. Co., Mishawaka, Ind.
Goldens Fdry. & Mach. Co., Columbus, Ga.
Wood's Sons Co., T. B., Chambersburg, Pa.

Cresosoted Tiles, Poles, Piles, etc.

Norfolk Cressoting Co., Norfolk, Va.

Culverts. (Corrugated Iron.)

Dixie Culvert & Metal Co., Atlanta, Ga.
Troy, W. B., Jr., Memphis, Tenn.

Culverts. (Sewer and Railroad—Clay.)

Stevens' Sons Co., H., Macon, Ga.

Cuts. (Half-tone, Line, etc.)

Baltimore Maryland Engraving Co., Balto., Md.

Cyanamid.

American Cyanamid Co., Baltimore, Md.

Dams. (Reinforced Concrete.)

Ambursen Hydraulic Con. Co., Boston, Mass.

Doors and Shutters. (Steel Rolling.)

Akers Fire Protective Co., Memphis, Tenn.

Doors. (Metallic.)

Dahlstrom Metallic Door Co., Jamestown, New York.

Doors. (Veneered.)

Massee & Felton Lumber Co., Macon, Ga.

Drills. (Electric Rock.)

Fort Wayne Electric Wks., Madison, Wis.

Dry Goods and Notions.

MacCarthy Co., Florence, W., Baltimore, Md.

Dust Collecting Apparatus.

South Atlantic Blowpipe & Sheet Metal Co., Savannah, Ga.

Electrical Machinery. (Dynamoes, Motors, etc.)

Fort Wayne Elec. Wks., Fort Wayne, Ind.
Lee Electric Co., Baltimore, Md.
Ridgway Dynamo & Eng. Co., Ridgway, Pa.
Robbins & Myers Co., Springfield, O.

Elevators.

Moffatt Mach. Mfg. Co., Charlotte, N. C.
Warsaw Elevator Works, Baltimore, Md.

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Allen Engineering Co., Memphis, Tenn.
Bartlett & Ranney, San Antonio, Tex.
Bradshaw-Ward Co., Memphis, Tenn.
Lylesby & Co., H. M., Chicago, Ill.
Cory, Harrison & Bryant, San Antonio, Tex.
George Company, Memphis, Tenn.
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Tait-Nordmeyer Engineering Co., St. Louis, Missouri.
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Rumely Company, M., La Porte, Ind.

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Fertilizers.

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International Agri. Corp., New York, N. Y.
Royster Guano Co., F. B., Norfolk, Va.
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Nicholson File Co., Providence, R. I.

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Dahlstrom Metallic Door Co., Jamestown, New York.

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American Furnace Device Co., Baltimore, Md.

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Specialty Engineering Co., Houston, Tex.

Gasoline.

Gulf Refining Co., Pittsburgh, Pa.
Red "C" Oil Mfg. Co., Baltimore, Md.

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Coldwell-Wilcox Co., Newburgh, N. Y.

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Pickering Governor Co., Portland, Conn.

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General Machine Wks., York, Pa.

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Goldens Fdry. & Mach. Co., Columbus, Ga.

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Vernon Inn, Clearwater, Fla.

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Central Georgia Power Co., Macon, Ga.
Fredericksburg Power Co., Fredericksburg, Virginia.
Roanoke Rapids Power Co., Roanoke Rapids, North Carolina.

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Specialty Engineering Co., Houston, Tex.

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Jemison Real Estate & Insurance Co., Birmingham, Ala.
Life Insurance Co. of Va., Richmond, Va.
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North State Life Ins. Co., Kingston, N. C.
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Iron Ore.

East Texas Brown Ore Development Co., Fort Belvoir, Tex.

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Shelby Iron Co., Shelby, Ala.
Southern Iron & Steel Co., Birmingham, Ala.

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Brooklyn & Co., Jacksonville, Fla.
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Stokers.

Allen, Herbert, F. L., Washington, D. C.

Stone. (Cut.)

Goetz, A. L., Austin, Tex.
Kirkpatrick Sand & Cement Co., Birmingham, Ala.
Wyatt, John T., Salisbury, N. C.

Structural Steel and Iron.

Chesapeake Iron Works, Baltimore, Md.
Chickasaw Iron Works, Memphis, Tenn.
Hoffman & Co., Inc., R. C., Baltimore, Md.
Memphis Bridge Co., Memphis, Tenn.
Southwestern Mechanical Co., Ft. Worth, Tex.

Stratton & Bragg Co., Petersburg, Va.
Virginia Bridge & Iron Co., Roanoke, Va.

Tags. (Shipping.)

Dennison Mfg. Co., Boston, Mass.

Tanks. (Iron and Steel.)

Schofield's Sons Co., J. S., Macon, Ga.

Tanks. (Cypress.)

Davis & Sons, G. M., Palatka, Fla.

Ties, Poles, Piles, etc. (Crossed.)

Norfolk Creaming Co., Norfolk, Va.

Tiles. (Ceramic, Encaustic, Terrazo, etc.)

Southern Mosaic Tile Co., Birmingham, Ala.

Trucks. (Lumber, etc.)

Goldens' Fdy. & Mch. Co., Columbus, Ga.
Merry Steel Truck Co., Memphis, Tenn.

Trust Companies.

American Trust Co., Houston, Tex.
Bankers' Trust Co., Houston, Tex.
Birmingham Trust & Savings Co., Birmingham, Ala.

Turbines. (Steam.)

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